SUZUKI

SV650/S/A/SA

SUPPLEMENTARY SERVICE MANUAL

USE THIS MANUAL WITH:
SV650 SERVICE MANUAL (99500-36123-01E)

SAMPLE

99501-36140-01E

SV650K7/SK7/AK7/SAK7 ('07-MODEL)

This manual describes service data, service specifications, servicing procedures ABS and servicing procedures which differ from those of the SV650K6/SV650SK6 ('06-model).

NOTE:
- *Any differences between the SV650K6/SV650SK6 ('06-model) and SV650K7/SV650SK7 ('07-model) in specifications and service data are indicated with an asterisk mark (*).*
- *Any differences between the SV650K7/SV650SK7 ('07-model) and SV650AK7/SV650SAK7 ('07-model) in specifications and service data are indicated with an asterisk mark (**).*
- *Please refer to the SV650SK6 ('06-model) service manual for details which are not given in this manual.*

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SV650K7/SK7/AK7/SAK7 ('07-MODEL)

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SAMPLE

COUNTRY AND AREA CODES

The following codes stand for the applicable country(-ies) and area(-s).

MODEL	CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
SV650	E-02	U.K.	JS1BY111200100001 –
	E-03	U.S.A. (Except for california)	JS1VP53A 72100001 –
	E-19	E.U.	JS1BY111100100001 –
	E-24	Australia	JS1BY111300100001 –
	E-28	Canada	JS1VP53A 72100001 –
	E-33	California (U.S.A.)	JS1VP53A 72100001 –
SV650S	E-02	U.K.	JS1BY132200100001 –
	E-03	U.S.A. (Except for california)	JS1VP53A 72100001 –
	E-19	E.U.	JS1BY132100100001 –
	E-24	Australia	JS1BY132300100001 –
	E-28	Canada	JS1VP53A 72100001 –
	E-33	California (U.S.A.)	JS1VP53A 72100001 –
SV650A	E-02	U.K.	JS1BY113200100001 –
	E-03	U.S.A. (Except for california)	JS1VP53B 72100001 –
	E-19	E.U.	JS1BY113100100001 –
	E-24	Australia	JS1BY113300100001 –
	E-28	Canada	JS1VP53B 72100001 –
	E-33	California (U.S.A.)	JS1VP53B 72100001 –
SV650SA	E-02	U.K.	JS1BY134200100001 –
	E-03	U.S.A. (Except for california)	JS1VP53B 72100001 –
	E-19	E.U.	JS1BY134100100001 –
	E-24	Australia	JS1BY134300100001 –
	E-28	Canada	JS1VP53B 72100001 –
	E-33	California (U.S.A.)	JS1VP53B 72100001 –
SV650U	E-19	E.U.	JS1BY211100100001 –
SV650SU	E-19	E.U.	JS1BY222100100001 –
SV650UA	E-19	E.U.	JS1BY213100100001 –
SV650SUA	E-19	E.U.	JS1BY224100100001 –

SAMPLE

ABBREVIATIONS USED IN THIS MANUAL

A

ABDC : After Bottom Dead Center
ABS : Anti-lock brake system
AC : Alternating Current
ACL : Air Cleaner, Air Cleaner Box
API : American Petroleum Institute
ATDC : After Top Dead Center
A/F : Air Fuel Mixture

B

BBDC : Before Bottom Dead Center
BTDC : Before Top Dead Center
B+ : Battery Positive Voltage

C

CKP Sensor : Crankshaft Position Sensor (CKPS)
CKT : Circuit
CLP Switch : Clutch Lever Position Switch (Clutch Switch)
CO : Carbon Monoxide
CPU : Central Processing Unit

D

DC : Direct Current
DMC : Dealer Mode Coupler
DOHC : Double Over Head Camshaft
DRL : Daytime Running Light
DTC : Diagnostic Trouble Code

E

ECM : Engine Control Module Engine Control Unit (ECU) (FI Control Unit)
ECT Sensor : Engine Coolant Temperature Sensor (ECTS), Water Temp. Sensor (WTS)
EVAP : Evaporative Emission
EVAP Canister : Evaporative Emission Canister (Canister)

F

FI : Fuel Injection, Fuel Injector
FP : Fuel Pump
FPR : Fuel Pressure Regulator
FP Relay : Fuel Pump Relay

G

GEN : Generator
GND : Ground
GP Switch : Gear Position Switch

H

HC : Hydrocarbons
HO2 Sensor : Heated Oxygen Sensor (HO2S)

I

IAP Sensor : Intake Air Pressure Sensor (IAPS)
IAT Sensor : Intake Air Temperature Sensor (IATS)
IG : Ignition
ISC Valve : Idle Speed control valve (ISCV)

L

LCD : Liquid Crystal Display
LED : Light Emitting Diode (Malfunction Indicator Lamp)
LH : Left Hand

M

MAL-Code : Malfunction Code (Diagnostic Code)
Max : Maximum
MIL : Malfunction Indicator Lamp (LED)
Min : Minimum

SAMPLE

N

NOx : Nitrogen Oxides

O

OHC : Over Head Camshaft
OPS : Oil Pressure Switch

P

PAIR : Pulsed Secondary Air Injection
PCV : Positive Crankcase Ventilation (Crankcase Breather)

R

RH : Right Hand
ROM : Read Only Memory

S

SAE : Society of Automotive Engineers
SDS : Suzuki Diagnosis System
STC System : Secondary Throttle Control System (STCS)
STP Sensor : Secondary Throttle Position Sensor (STPS)
ST Valve : Secondary Throttle Valve (STV)
STV Actuator : Secondary Throttle Valve Actuator (STVA)

SAMPLE

T

TO Sensor : Tip Over Sensor (TOS)
TP Sensor : Throttle Position Sensor (TPS)

SAE-TO-FORMER SUZUKI TERM

This table lists SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
A		
Anti-lock brake system	ABS	Anti-lock brake system
Air Cleaner	ACL	Air Cleaner, Air Cleaner Box
B		
Barometric Pressure	BARO	Barometric Pressure, Atmospheric Pressure (APS, AP Sensor)
Battery Positive Voltage	B+	Battery Voltage, +B
C		
Crankshaft Position Sensor	CKP Sensor	Crankshaft Position Sensor (CKPS), Crank Angle
D		
Data Link Connector	DLC	Dealer Mode Coupler
Diagnostic Test Mode	DTM	——
Diagnostic Trouble Code	DTC	Diagnostic Code, Malfunction Code
E		
Electronic Ignition	EI	——
Engine Control Module	ECM	Engine Control Module (ECM) FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level	ECL	Coolant Level
Engine Coolant Temperature	ECT	Coolant Temperature, Engine Coolant Temperature, Water Temperature
Engine Speed	RPM	Engine Speed (RPM)
Evaporative Emission	EVAP	Evaporative Emission
Evaporative Emission Canister	EVAP Canister	—— (Canister)
F		
Fan Control	FC	——
Fuel Level Sensor	——	Fuel Level Sensor, Fuel Level Gauge
Fuel Pump	FP	Fuel Pump (FP)
G		
Generator	GEN	Generator
Ground	GND	Ground (GND, GRD)
H		
Heated Oxygen Sensor	HO2S	Heated Oxygen Sensor (HO2S), O2 Sensor

SAMPLE

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
I		
Idle Speed Control	ISC	——
Idle Speed Control Valve	——	ISC Valve
Ignition Control	IC	Electronic Spark Advance (ESA)
Ignition Control Module	ICM	——
Intake Air Temperature	IAT	Intake Air Temperature (IAT), Air Temperature
M		
Malfunction Indicator Lamp	MIL	LED Lamp Malfunction Indicator Lamp (MIL)
Manifold Absolute Pressure	MAP	Intake Air Pressure, Intake Vacuum
Mass Air Flow	MAF	Air Flow
O		
On-Board Diagnostic	OBD	Self-Diagnosis Function Diagnostic
Open Loop	OL	——
P		
Programmable Read Only Memory	PROM	——
Pulsed Secondary Air Injection	PAIR	Pulse Air Control (PAIR)
Purge Valve	Purge Valve	Purge Valve (SP Valve)
R		
Random Access Memory	RAM	——
Read Only Memory	ROM	ROM
S		
Secondary Air Injection	AIR	——
Secondary Throttle Control System	STCS	STC System (STCS)
Secondary Throttle Valve	STV	ST Valve (STV)
Secondary Throttle Valve Actuator	STVA	STV Actuator (STVA)
T		
Throttle Body	TB	Throttle Body (TB)
Throttle Body Fuel Injection	TBI	Throttle Body Fuel Injection (TBI)
Throttle Position Sensor	TP Sensor	TP Sensor (TPS)
V		
Voltage Regulator	VR	Voltage Regulator
Volume Air Flow	VAF	Air Flow

SAMPLE

SPECIFICATIONS (SV650K7/SV650SK7)

DIMENSIONS AND DRY MASS

Overall length	2 080 mm (81.9 in)	SV650
	2 085 mm (82.1 in)	SV650S
Overall width	745 mm (29.3 in)	SV650
	730 mm (28.7 in)	SV650S
Overall height	1 085 mm (42.7 in)	SV650
	1 170 mm (46.1 in)	SV650S
Wheelbase	1 440 mm (56.7 in)	SV650
	* 1 425 mm (56.1 in)	SV650S
Ground clearance	150 mm (5.9 in)	SV650
	155 mm (6.1 in)	SV650S
Seat height	800 mm (31.5 in)	
Dry mass	* 168 kg (370 lbs)	SV650
	* 172 kg (379 lbs)	SV650S

ENGINE

Type	4-stroke, liquid-cooled, DOHC, 90°-degree V-twin
Number of cylinders	2
Bore	81.0 mm (3.189 in)
Stroke	62.6 mm (2.465 in)
Displacement	645 cm^3 (39.4 cu. in)
Compression ratio	11.5 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 300 ± 100 r/min

SAMPLE

DRIVE TRAIN

Clutch	Wet multi-plate type	
Transmission	6-speed constant mesh	
Gearshift pattern	1-down, 5-up	
Primary reduction ratio	2.088 (71/34)	
Gear ratios, Low	2.461 (32/13)	
2nd	1.777 (32/18)	
3rd	1.380 (29/21)	
4th	1.125 (27/24)	
5th	0.961 (25/26)	
Top	0.851 (23/27)	
Final reduction ratio	3.000 (45/15)	SV650
	* 3.000 (45/15)	SV650S
Drive chain	DID 525V8, 110 links	SV650
	DID 525V8, 108 links	SV650S

CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Link type, coil spring, oil damped
Front fork stroke	130 mm (5.1 in) SV650
	125 mm (4.9 in) SV650S
Rear wheel travel	137 mm (5.4 in) SV650
	134 mm (5.3 in) SV650S
Caster	25°
Trail	102 mm (4.02 in) SV650
	100 mm (3.94 in) SV650S
Steering angle	32° (right & left) SV650
	30° (right & left) SV650S
Turning radius	3.0 m (9.8 ft) SV650
	3.2 m (10.5 ft) SV650S
Front brake	Disc brake, twin
Rear brake	Disc brake
Front tire size	120/60 ZR17 M/C (55W), tubeless
Rear tire size	160/60 ZR17 M/C (69W), tubeless

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	* 8° B.T.D.C. at 1 300 r/min
Spark plug	NGK CR8E or DENSO U24ESR-N
Battery	12 V 36.0 kC (10 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	10/10/15/10/10/10 A SV650
	15/15/15/10/10/10 A SV650S
Headlight	12 V 60/55 W (H4) SV650
	12 V 60/55 W (H4) × 2 .... SV650S
Position/Parking light	12 V 5 W ...... Except E-03, 24, 28, 33 .... SV650
	12 V 5 W × 2 .... SV650S
Brake light/Taillight	LED
Licence plate light	12 V 5 W
Turn signal light	12 V 21 W
Speedometer light	LED
Tachometer light	LED
Turn signal indicator light	LED
Neutral indicator light	LED
High beam indicator light	LED
Oil pressure/Coolant temperature/ Fuel injection indicator light	LED
Fuel indicator light	LED

SAMPLE

CAPACITIES

Fuel tank, including reserve	16.0 L (4.2/3.5 US/Imp gal) E-33
	17.0 L (4.5/3.7 US/Imp gal) .... Others
Engine oil, oil change	2 300 ml (2.4/2.0 US/Imp qt)
with filter change	2 700 ml (2.9/2.4 US/Imp qt)
overhaul	3 100 ml (3.3/2.7 US/Imp qt)
Coolant	1.7 L (1.8/1.5 US/Imp qt)

These specifications are subject to change without notice.

SPECIFICATIONS (SV650AK7/SV650SAK7)

DIMENSIONS AND DRY MASS

Overall length	**	2 120 mm (83.5 in)	SV650A
	**	2 120 mm (83.5 in)	SV650SA
Overall width		745 mm (29.3 in)	SV650A
		730 mm (28.7 in)	SV650SA
Overall height		1 085 mm (42.7 in)	SV650A
		1 170 mm (46.1 in)	SV650SA
Wheelbase	**	1 470 mm (57.9 in)	SV650A
	**	1 470 mm (57.9 in)	SV650SA
Ground clearance	**	155 mm (6.1 in)	SV650A
		155 mm (6.1 in)	SV650SA
Seat height		800 mm (31.5 in)	
Dry mass	**	171 kg (376 lbs)	SV650A
	**	175 kg (385 lbs)	SV650SA

ENGINE

Type	4-stroke, liquid-cooled, DOHC, 90°-degree V-twin
Number of cylinders	2
Bore	81.0 mm (3.189 in)
Stroke	62.6 mm (2.465 in)
Displacement	645 cm^3 (39.4 cu. in)
Compression ratio	11.5 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric
Lubrication system	Wet sump
Idle speed	1 300 ± 100 r/min

SAMPLE

DRIVE TRAIN

Clutch		Wet multi-plate type	
Transmission		6-speed constant mesh	
Gearshift pattern		1-down, 5-up	
Primary reduction ratio		2.088 (71/34)	
Gear ratios, Low		2.461 (32/13)	
2nd		1.777 (32/18)	
3rd		1.380 (29/21)	
4th		1.125 (27/24)	
5th		0.961 (25/26)	
Top		0.851 (23/27)	
Final reduction ratio		3.000 (45/15)	SV650A
		3.000 (45/15)	SV650SA
Drive chain	**	DID 525V8, 114 links	SV650A
Drive chain	**	DID 525V8, 114 links	SV650SA

CHASSIS

Item		Specification	Model
Front suspension		Telescopic, coil spring, oil damped	
Rear suspension		Link type, coil spring, oil damped	
Front fork stroke		130 mm (5.1 in)	SV650A
	**	130 mm (5.1 in)	SV650SA
Rear wheel travel	**	147 mm (5.8 in)	SV650A
Rear wheel travel	**	147 mm (5.8 in)	SV650SA
Caster		25°	
Trail		102 mm (4.02 in)	SV650A
		100 mm (3.94 in)	SV650SA
Steering angle		32° (right & left)	SV650A
		30° (right & left)	SV650SA
Turning radius	**	3.1 m (10.2 ft)	SV650A
	**	3.3 m (10.8 ft)	SV650SA
Front brake		Disc brake, twin	
Rear brake		Disc brake	
Front tire size		120/60 ZR17 M/C (55W), tubeless	
Rear tire size		160/60 ZR17 M/C (69W), tubeless	

ELECTRICAL

Item		Specification	Model
Ignition type		Electronic ignition (Transistorized)	
Ignition timing		8° B.T.D.C. at 1 300 r/min	
Spark plug		NGK CR8E or DENSO U24ESR-N	
Battery		12 V 36.0 kC (10 Ah)/10 HR	
Generator		Three-phase A.C. generator	
Main fuse		30 A	
Fuse	**	10/10/15/10/10/10/25/40 A	SV650A
	**	15/15/15/10/10/10/25/40 A	SV650SA
Headlight		12 V 60/55 W (H4)	SV650A
		12 V 60/55 W (H4) × 2	SV650SA
Position/Parking light		12 V 5 W ...... Except E-03, 24, 28, 33	SV650A
		12 V 5 W × 2	SV650SA
Brake light/Taillight		LED	
Licence plate light		12 V 5 W	
Turn signal light		12 V 21 W	
Speedometer light		LED	
Tachometer light		LED	
Turn signal indicator light		LED	
Neutral indicator light		LED	
High beam indicator light		LED	
Oil pressure/Coolant temperature/ Fuel injection indicator light		LED	
Fuel indicator light		LED	
ABS indicator light		LED	

SAMPLE

CAPACITIES

Item		Specification	Model
Fuel tank, including reserve		16.0 L (4.2/3.5 US/Imp gal)	E-33
		17.0 L (4.5/3.7 US/Imp gal)	Others
Engine oil,	oil change	2 300 ml (2.4/2.0 US/Imp qt)	
	with filter change	2 700 ml (2.9/2.4 US/Imp qt)	
	overhaul	3 100 ml (3.3/2.7 US/Imp qt)	
Coolant		1.7 L (1.8/1.5 US/Imp qt)	

These specifications are subject to change without notice.

PERIODIC MAINTENANCE SCHEDULE

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Mileages are expressed in terms of kilometers, miles and time for your convenience.

NOTE:
More frequent servicing may be performed on motorcycles that are used under severe conditions.

PERIODIC MAINTENANCE CHART

Item / Interval		1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	14 500
	months	2	12	24	36	48
Air cleaner element		—	I	I	R	I
Exhaust pipe bolts and muffler bolts		T	T	T	T	T
Valve clearance		—	—	—	—	I
Spark plugs		—	I	R	I	R
Fuel hose		—	I	I	I	I
		Replace every 4 years.				
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Throttle cable play		I	I	I	I	I
Throttle valve synchronization		I (E-33 only)	—	I	—	I
Evaporative emission control system (E-33 only)		—	—	I	—	I
		Replace vapor hose every 4 years.				
PAIR (air supply) system		—	—	I	—	I
Engine coolant		Replace every 2 years.				
Radiator hose		—	I	I	I	I
		Replace every 4 years.				
Clutch		—	I	I	I	I
Drive chain		I	I	I	I	I
		Clean and lubricate every 1 000 km (600 miles).				
Brakes		I	I	I	I	I
Brake hose		—	I	I	I	I
		Replace every 4 years.				
Brake fluid		—	I	I	I	I
		Replace every 2 years.				
Tires		—	I	I	I	I
Steering		I	—	I	—	I
Front forks		—	—	I	—	I
Rear suspension		—	—	I	—	I
Chassis bolts and nuts		T	T	T	T	T

Header first row: km.

NOTE:
I = Inspect and clean, adjust, replace or lubricate as necessary; R = Replace; T = Tighten

SAMPLE

MAINTENANCE AND TUNE-UP PROCEDURES

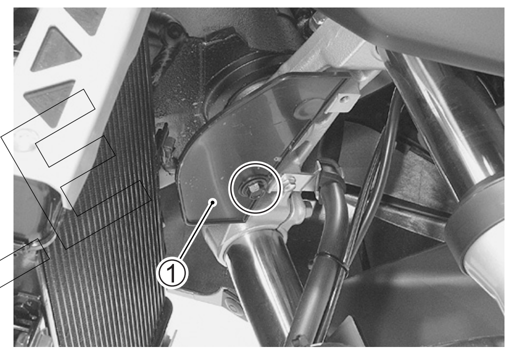
This section describes the servicing procedures for each Periodic Maintenance item which differ from those of the SV650/SK6 ('06-MODEL).
For details other than the following items, refer to the SV650/S Service Manual.

SPARK PLUG

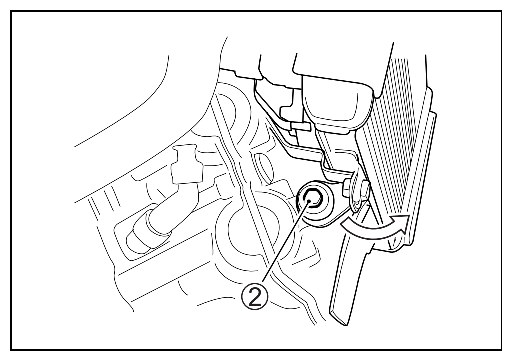
Inspect every 6 000 km (4 000 miles, 12 months) and replace every 12 000 km (7 500 miles, 24 months).

NO.1 (FRONT) SPARK PLUG REMOVAL

- Remove the front upper fender ①.



- Remove the radiator mounting bolt ②.



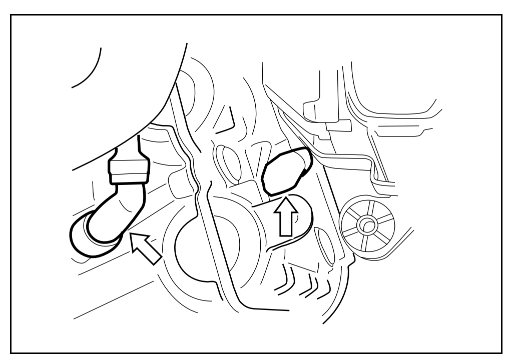
⚠ WARNING

The hot radiator and the hot engine can burn you. Wait until the radiator and the engine are cool enough to touch.

- Move the lower part of the radiator forward.

NOTE:
Do not extract the radiator hoses.

- Remove the spark plug caps.

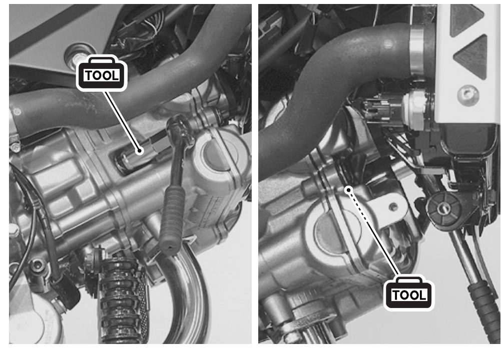


NOTE:
Be careful not to damage the radiator fins.

SAMPLE

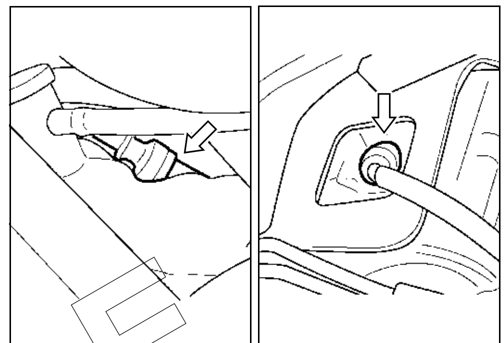
• Remove the spark plugs with the special tool.

09930-10121: Spark plug socket wrench set



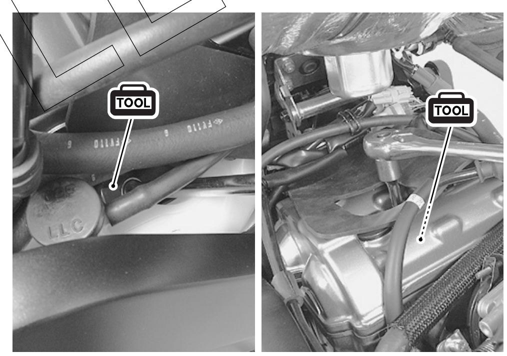
NO.2 (REAR) SPARK PLUG REMOVAL

• Lift and support the fuel tank with its prop stay.
  (☞SV650/SK3 5-6)
• Remove the spark plug caps.



• Remove the spark plugs with the special tool.

09930-10121: Spark plug socket wrench set



SAMPLE

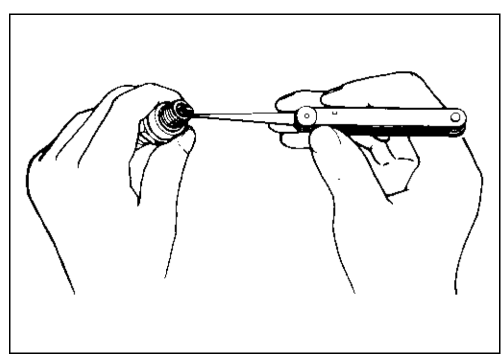
HEAT RANGE

• Check to see the heat range of the plug.

	Standard	Cold type	Hot type
NGK	CR8E	CR9E	CR7E
DENSO	U24ESR-N	U27ESR-N	U22ESR-N

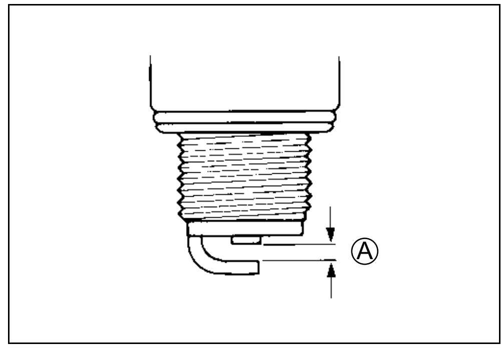
CARBON DEPOSIT

• Check to see if there are carbons deposit on the plugs. If carbon is deposited, remove it with a spark plug cleaner machine or carefully using a tool with a pointed end.



SPARK PLUG GAP

- Measure the plug gap with a thickness gauge. If out of specification, adjust it to the following gap.



DATA **Spark plug gap Ⓐ**
Standard: 0.7 – 0.8 mm (0.028 – 0.031 in)

TOOL **09900-20803: Thickness gauge**

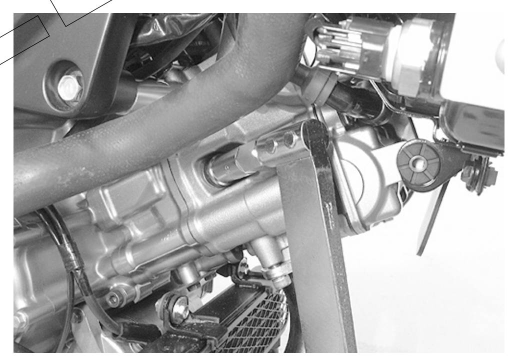
ELECTRODES CONDITION

- Check to see the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, damaged thread.

CAUTION

Confirm the thread size and reach when replacing the plug. If the reach is too short, carbon will be deposited on the screw portion of the plug hole and engine damage may result.

SPARK PLUG AND PLUG CAP INSTALLATION



CAUTION

Before using a spark plug wrench, carefully turn the spark plug by finger into the threads of the cylinder head to prevent damage the aluminum threads.

- Install the spark plugs to the cylinder heads by finger tight, and then tighten them to the specified torque.

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lb-ft)

NOTE:
When fitting the spark plug caps, front and rear of cylinder head cover side, face the triangle mark Ⓐ on the water-proof cover to each cylinder exhaust side.



SAMPLE

THROTTLE VALVE SYNCHRONIZATION

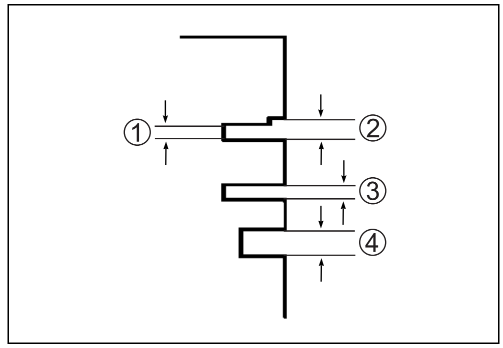
Inspect initially at 1 000 km (600 miles, 2 months) (E-33 only) and every 12 000 km (7 500 miles, 24 months).

Inspect the throttle valve synchronization periodically. (☞Page 62)

ENGINE COMPONENTS INSPECTION AND SERVICING

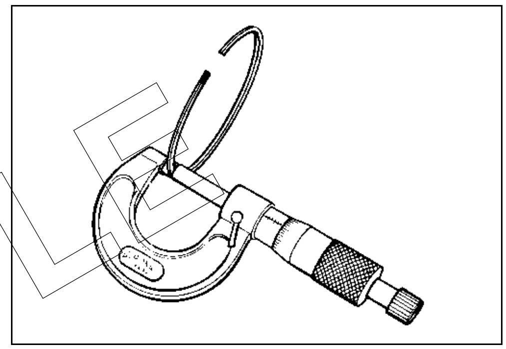
For details other than the following, refer to the SV650/S Service Manual.

PISTON AND PISTON RING



DATA Piston ring groove width

Standard (1st) : 0.83 – 0.85 mm (0.0327 – 0.0335 in) ①
1.30 – 1.32 mm (0.0512 – 0.0520 in) ②
(2nd) : 1.01 – 1.03 mm (0.0398 – 0.0406 in) ③
(Oil) : 2.01 – 2.03 mm (0.0791 – 0.0799 in) ④



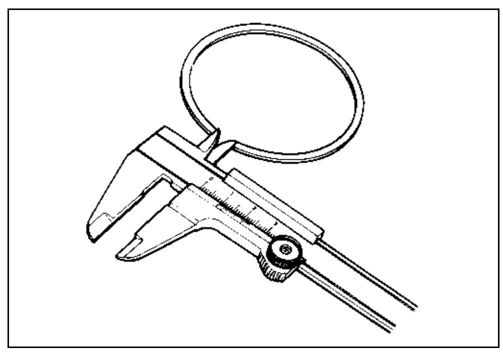
DATA Piston ring thickness

Standard (1st) : 0.76 – 0.81 mm (0.0299 – 0.0319 in)
1.08 – 1.10 mm (0.0425 – 0.0433 in)
(2nd) : 0.97 – 0.99 mm (0.0382 – 0.0390 in)

TOOL 09900-20803: Thickness gauge
09900-20205: Micrometer (0 – 25 mm)

SAMPLE

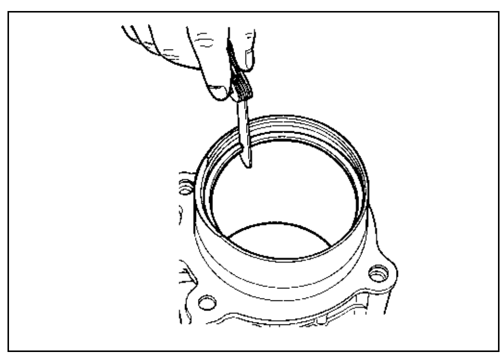
PISTON RING FREE END GAP AND PISTON RING END GAP



DATA Piston ring free end gap

Standard (1st) : Approx. 7 mm (0.28 in)
(2nd) : Approx. 11 mm (0.43 in)
Service Limit (1st) : 5.6 mm (0.22 in)
(2nd) : 8.8 mm (0.34 in)

TOOL 09900-20101: Vernier caliper



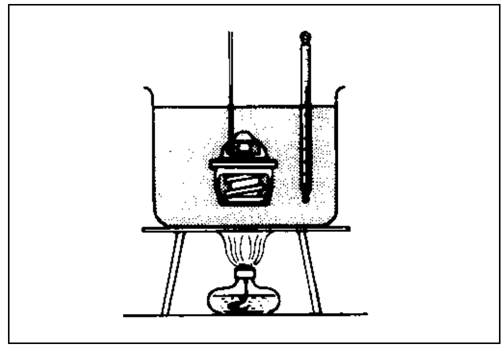
DATA Piston ring end gap

Standard (1st) : 0.20 – 0.30 mm (0.008 – 0.012 in)
(2nd) : 0.30 – 0.45 mm (0.012 – 0.018 in)
Service Limit (1st) : 0.70 mm (0.028 in)
(2nd) : 0.70 mm (0.028 in)

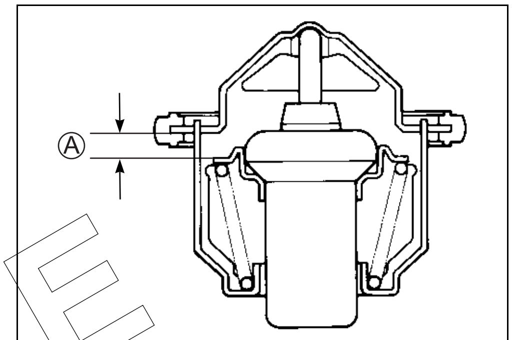
TOOL 09900-20803: Thickness gauge

THERMOSTAT

DATA Thermostat valve opening temperature
Standard: Approx. 76.5 °C (170 °F)



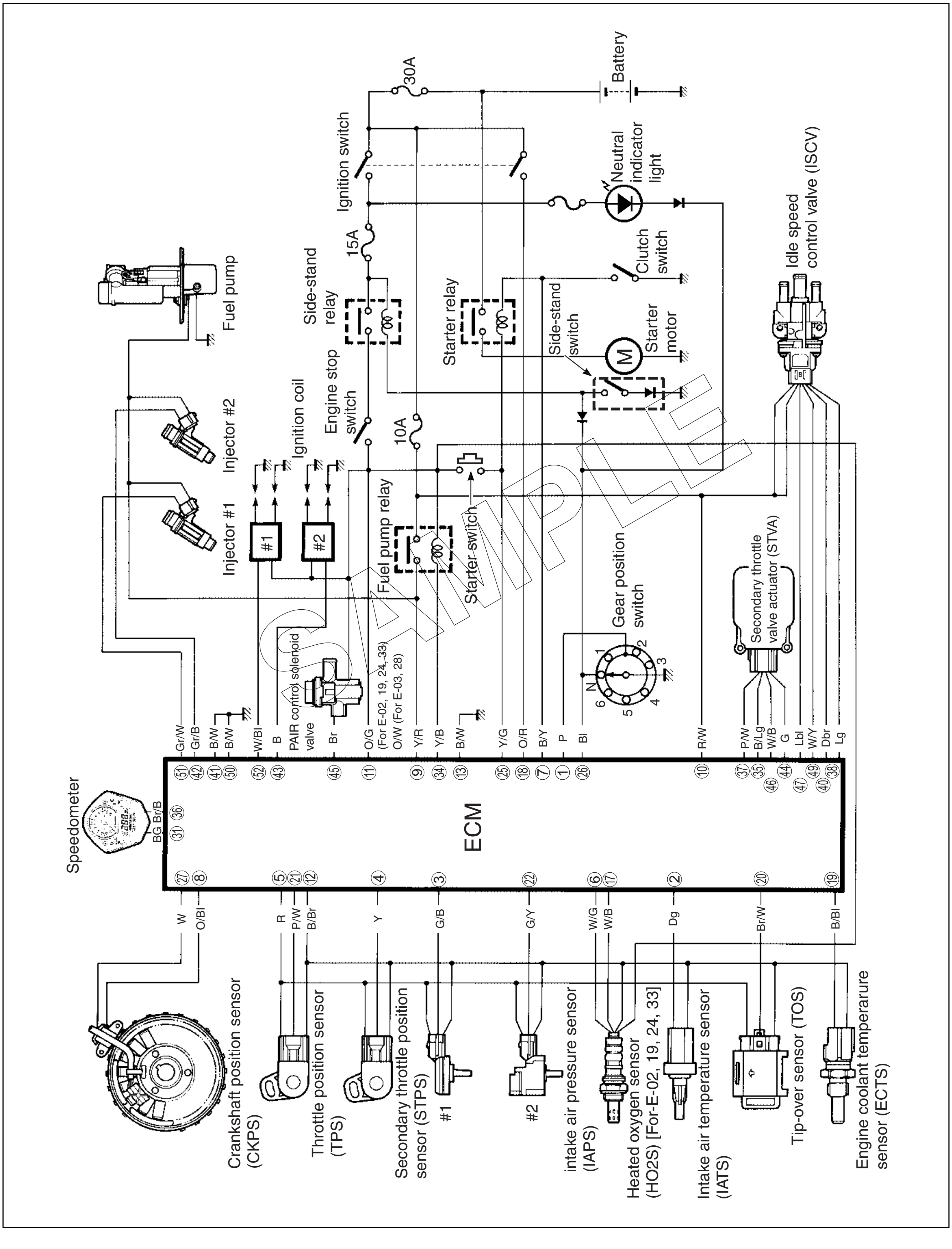
DATA Thermostat valve lift Ⓐ
Standard:
8.0 mm and over at 90 °C (0.31 in and over at 194 °F)



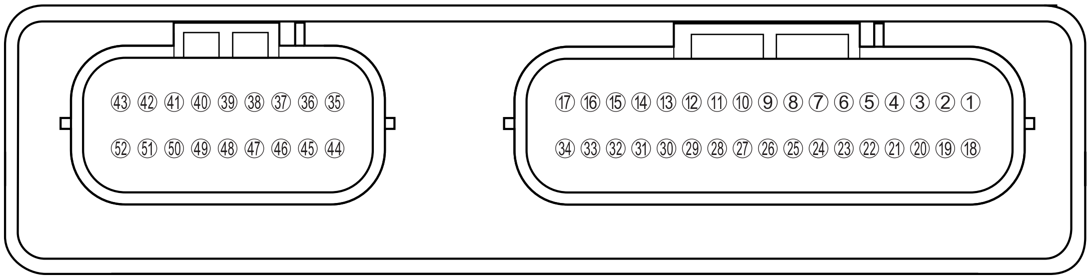
SAMPLE

FI SYSTEM DIAGNOSIS

FI SYSTEM WIRING DIAGRAM



ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	GP switch signal (GP)	⑱	—
②	IAT sensor signal (IAT)	⑲	ECT sensor signal (ECT)
③	IAP sensor signal #1 (IAP. F)	⑳	TO sensor signal (TOS)
④	STP sensor signal (STP)	㉑	TP sensor signal (TP)
⑤	Power source for sensors (VCC)	㉒	IAP sensor signal #2 (IAP. R)
⑥	HO2 sensor signal [For E-02, 19, 24, 33]	㉓	—
⑦	Clutch lever position switch (CLT)	㉔	Mode select switch
⑧	CKP sensor signal (CKP–)	㉕	Starter switch signal
⑨	Power source for fuel injector (VM)	㉖	Neutral switch signal
⑩	Power source for back-up	㉗	CKP sensor signal (CKP+)
⑪	Power source	㉘	—
⑫	Sensor ground (E2)	㉙	—
⑬	ECM ground (E1)	㉚	—
⑭	—	㉛	Serial data for speedometer (TECH)
⑮	—	㉜	Serial data for self-diagnosis
⑯	—	㉝	—
⑰	HO2 sensor heater (HO2. H) [For E-02, 19, 24, 33]	㉞	Fuel pump relay (FP Relay)

SAMPLE

TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
㉟	STVA signal (STVA. 1B)	㊹	STVA signal (STVA. 2B)
㊱	Tachometer	㊺	PAIR control solenoid valve (PAIR)
㊲	STVA signal (STVA. 1A)	㊻	STVA signal (STVA. 2A)
㊳	ISC signal (ISC. 2B)	㊼	ISC signal (ISC. 1A)
㊴	Blank	㊽	—
㊵	ISC signal (ISC. 2A)	㊾	ISC signal (ISC. 1B)
㊶	Ground	㊿	Ground
㊷	Fuel injector #2 (#21)	(51)	Fuel injector #1 (#11)
㊸	Ignition coil #2	(52)	Ignition coil #1

FAIL-SAFE FUNCTION

FI system is provided with fail-safe function to allow the engine to start and the motorcycle to run in a minimum performance necessary even under malfunction condition.

ITEM	FAIL-SAFE MODE	STARTING ABILITY	RUNNING ABILITY
Intake air pressure sensor (Front & Rear)	Intake air pressure is fixed to 760 mmHg.	"YES"	"YES"
Throttle position sensor	TPS opening value is fixed to full open position.	"YES"	"YES"
Engine coolant temp. sensor	Engine coolant temperature value is fixed to 70 °C.	"YES"	"YES"
Intake air temperature sensor	Intake air temperature value is fixed to 25 °C.	"YES"	"YES"
Ignition signal #1 (IG coil #1)	#1 Ignition-off and #1 Fuel-cut	"YES"	"YES"
		#2 cylinder can run.	
Ignition signal #2 (IG coil #2)	#2 Ignition-off and #2 Fuel-cut	"YES"	"YES"
		#1 cylinder can run.	
Injection signal #1	#1 Fuel-cut	"YES"	"YES"
		#2 cylinder can run.	
Injection signal #2	#2 Fuel-cut	"YES"	"YES"
		#1 cylinder can run.	
HO2 sensor (For E-02, 19, 24, 33)	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
Secondary throttle valve actuator	Secondary throttle valve is fixed in any position.	"YES"	"YES"
Secondary throttle position sensor	Secondary throttle valve is stopped.	"YES"	"YES"
Gear position signal	Gear position signal is fixed to 4th gear.	"YES"	"YES"
PAIR control solenoid valve	O2 feedback control is stopped and PAIR valve is fixed to open position.	"YES"	"YES"
ISC valve	When motor disconnection or lock occurs, ISC valve is stopped.	"YES"	"YES"

The engine can start and can run even if the above signal is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the motorcycle to the workshop for complete repair.

When two ignition signals or two injector signals are not received by ECM, the fail-safe circuit can not work and ignition or injection is stopped.

SAMPLE

DTC TABLE AND DEFECTIVE CONDITION

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C00		NO FAULT	————	————
C12 (P0335)		CKP sensor	The signal does not reach ECM for 2 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection
C13 (P1750)/ C17 (P0105)		IAP sensor	The sensor should produce following voltage. 0.1 V ≦ sensor voltage ≦ 4.8 V In other than the above range, C13 (P1750) or C17 (P0105) is indicated.	IAP sensor, lead wire/coupler connection
C14 (P0120)		TP sensor	The sensor should produce following voltage. 0.1 V < sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open
C15 (P0115)		ECT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage ≦ 4.6 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C21 (P0110)		IAT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage ≦ 4.6 V In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground

SAMPLE

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C23 (P1651)		TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V < sensor voltage < 4.6 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or VCC circuit open
C24 (P0351)/ C25 (P0352)		Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 8 times or more continuously. In this case, the code C24 (P0351) or C25 (P0352) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery
C28 (P1655)		Secondary throttle valve actuator	When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate.	STVA motor, STVA lead wire/coupler
C29 (P1654)		STP sensor	The sensor should produce following voltage. 0.1 V < sensor voltage < 4.83 V In other than the above range, C29 (P1654) is indicated.	STP sensor, lead wire/coupler connection
P1654	H		Sensor voltage is higher than specified value.	STP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to ground or VCC circuit open
C31(P0705)		Gear position signal	When gear position switch voltage is as follows. GP switch voltage > 0.2 V for 4 sec. and more When gear position switch voltage is neutral and switch voltage is as follows. GP switch voltage ≧ 4.77 V for 4 sec. and more If lower than the above value, C31 (P0705) is indicated	GP switch, wiring/coupler connection, gearshift cam, etc.

SAMPLE

DTC No.	DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C32 (P0201)/ C33 (P0202)	Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted several times (Front 8 times, Rear 8 times) or more continuously. In this case, the code C32 (P0201) or C33 (P0202) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector
C40 (P0505)	ISC valve	The circuit voltage of motor drive is unusual. Idle speed is higher than the normal condition.	ISC valve circuit open or shorted to ground Power source circuit open ISC valve is fixed to full open Disconnected ISC valve hose
C40 (P0506)		Idle speed is lower than the desired idle speed.	Air passage clogged ISC valve is fixed ISC valve PRE-SET position is incorrect
C40 (P0507)		Idle speed is higher than the desired idle speed.	ISC valve hose connection ISC valve is fixed ISC valve PRE-SET position is incorrect
C41 (P0230)	Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/coupler connection, power source to fuel pump relay and fuel injectors
C42 (P1650)	Ignition switch	Ignition switch signal is not input to ECM.	Ignition switch, lead wire/coupler
C44 (P0130)	HO2 sensor (E-02, 19, 24, 41)	After engine is started few minutes. (Sensor output voltage $\geqq$ 2.5 V) Engine is cold and stopped. (Sensor output voltage < 0.1 V) In other than the above value, C44 (P0130) is indicated.	HO2 sensor circuit open or shorted to ground
C44 (P0135)		The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor lead wire/coupler connection Battery voltage supply to the HO2 sensor
C49 (P1656)	PAIR control solenoid valve	PAIR control solenoid valve voltage is not input to ECM.	PAIR control solenoid valve, lead wire/coupler

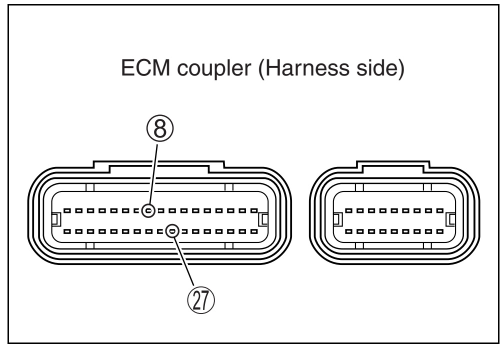
SAMPLE

DTC TROUBLESHOOTING

"C12" (P0335) CKP SENSOR CIRCUIT MALFUNCTION

On model K7, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

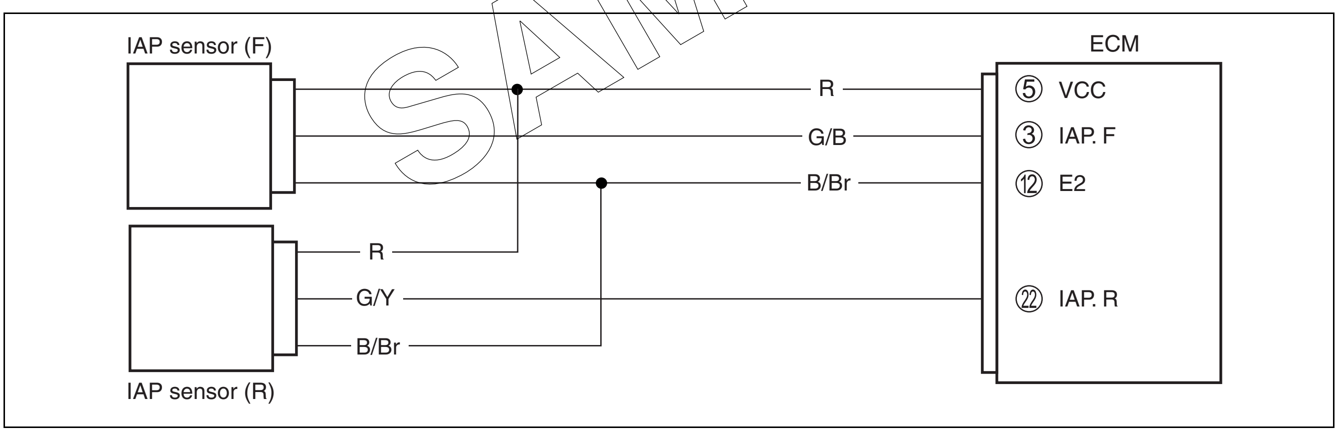
*** Refer to the SV650/S service manual 4-23 for details.**



"C13" (P1750) or "C17" (P0105) IAP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
IAP sensor voltage low or high 0.1 ≦ Sensor voltage ≦ 4.8 V *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude.* *Take that into consideration when inspecting voltage.*	• Clogged vacuum passage between throttle body and IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • IAP sensor circuit open or shorted to ground. • IAP sensor malfunction. • ECM malfunction.

SAMPLE

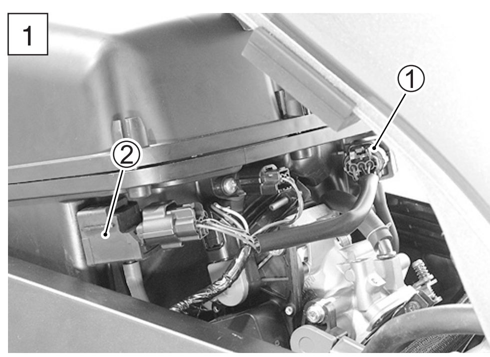


INSPECTION

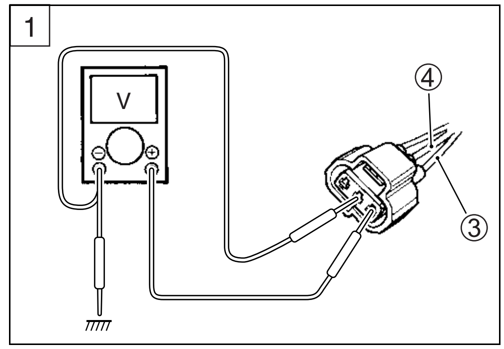
NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1
(When indicating C13/P1750 for rear cylinder IAP sensor)
(When indicating C17/P0105 for front cylinder IAP sensor)

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
3) Check the IAP sensor coupler (Front cylinder side ① or Rear cylinder side ②) for loose or poor contacts.
   If OK, then measure the IAP sensor input voltage.



4) Disconnect the IAP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire ③ and ground.
7) Also, measure the voltage at the Red wire ③ and B/Br wire ④.



DATA **IAP sensor input voltage: 4.5 – 5.5 V**
(⊕ Red – ⊖ Ground)
(⊕ Red – ⊖ B/Br)

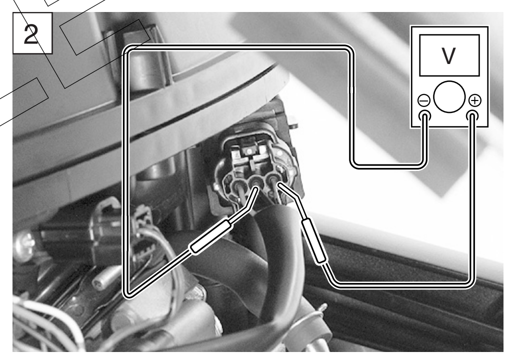
TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑤ or ⑫). • Open or short circuit in the Red wire or B/Br wire.

Step 2
1) Connect the IAP sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Start the engine at idle speed and measure the IAP sensor output voltage at the wire side coupler.
(Front cylinder side: between G/B and B/Br wires)
(Rear cylinder side: between G/Y and B/Br wires)



DATA **IAP sensor output voltage: Approx. 2.5 V at idle speed**
(Front cylinder side: ⊕ G/B – ⊖ B/Br)
(Rear cylinder side: ⊕ G/Y – ⊖ B/Br)

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

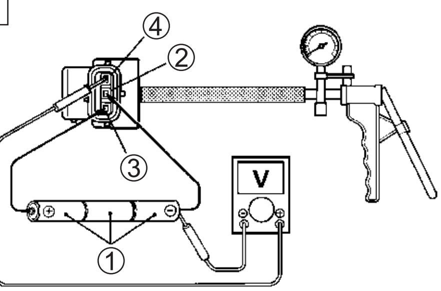
YES	Go to Step 3.
NO	• Check the vacuum hose for crack or damage. • Open or short circuit in the G/B wire. (Front cylinder side) • Open or short circuit in the G/Y wire. (Rear cylinder side) • If vacuum hose and wire are OK, replace the IAP sensor with a new one.

SAMPLE

Step 3

1) Turn the ignition switch OFF.
2) Remove the IAP sensor.
3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
4) Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 – 5.0 V) and connect ⊖ terminal to the ground terminal ② and ⊕ terminal to the Vcc terminal ③.
5) Check the voltage between Vout ④ and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge. (☞below)

3



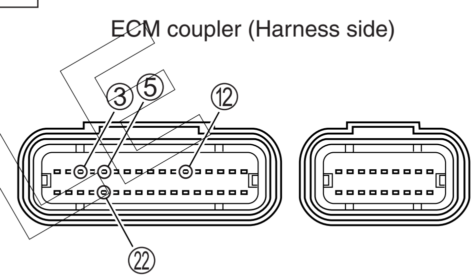
TOOL **09917-47011: Vacuum pump gauge**
09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• G/B, R or B/Br wire open or shorted to ground, or poor ③, ⑤ or ⑫ connection. (Front cylinder side) • R, B/Br or G/Y wire open or shorted to ground, or poor ⑤, ⑫ or ㉒ connection. (Rear cylinder side) • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace the IAP sensor with a new one.

3



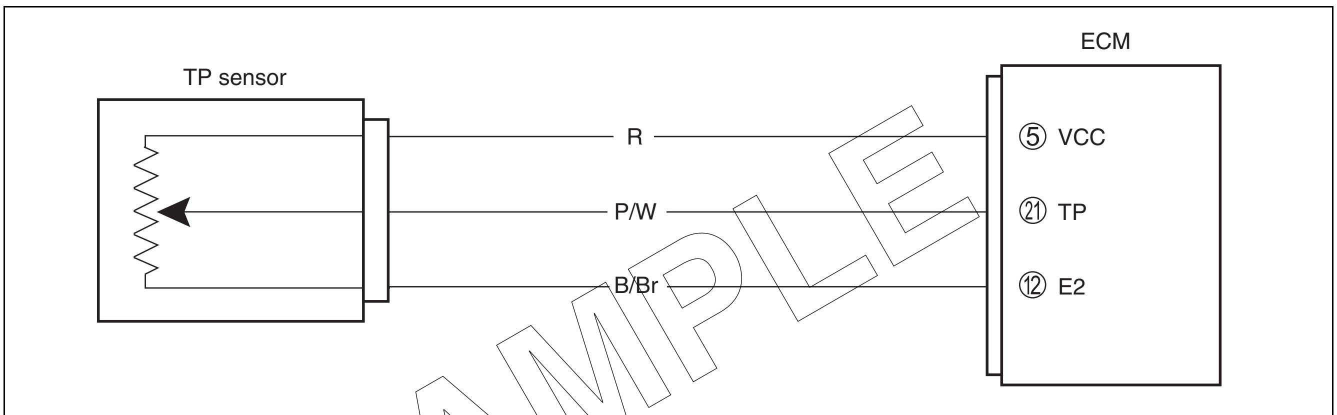
SAMPLE

Output voltage (Vcc voltage 4.5 – 5.0 V, ambient temp. 20 – 30 °C, 68 – 86 °F)

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	kPa	(V)
0 | 2 000	0 | 610	760 | 707	100 | 94	3.4 – 4.0
2 001 | 5 000	611 | 1 524	707 | 634	94 | 85	3.0 – 3.7
5 001 | 8 000	1 525 | 2 438	634 | 567	85 | 76	2.6 – 3.4
8 001 | 10 000	2 439 | 3 048	567 | 526	76 | 70	2.4 – 3.1

"C14" (P0120-H/L) TP SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION			POSSIBLE CAUSE
C14 (P0120)		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V < Sensor voltage < 4.8 V	• TP sensor maladjusted • TP sensor circuit open or short • TP sensor malfunction • ECM malfunction
P0120	H	Sensor voltage is higher than specified value.	• TP sensor circuit shorted to VCC or ground circuit open
	L	Sensor voltage is lower than specified value.	• TP sensor circuit open or shorted to ground or VCC circuit open



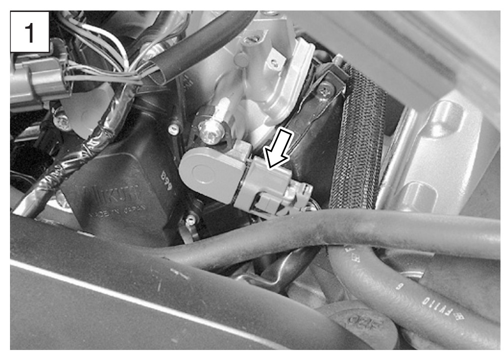
SAMPLE

INSPECTION

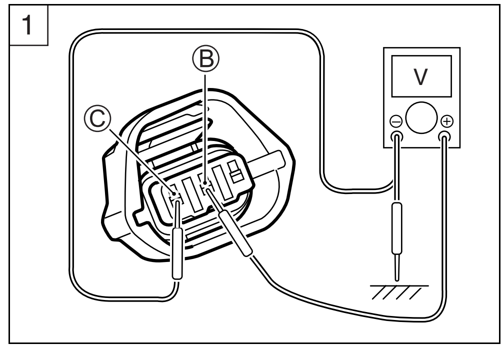
NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
3) Check the TP sensor coupler for loose or poor contacts. If OK, then measure the TP sensor input voltage.
4) Disconnect the TP sensor coupler.
5) Turn the ignition switch ON.



6) Measure the voltage at the Red wire Ⓑ and ground.
7) Also, measure the voltage at the Red wire Ⓑ and B/Br wire Ⓒ.



DATA **TP sensor input voltage: 4.5 – 5.5 V**
(⊕ Red – ⊖ Ground)
(⊕ Red – ⊖ B/Br)

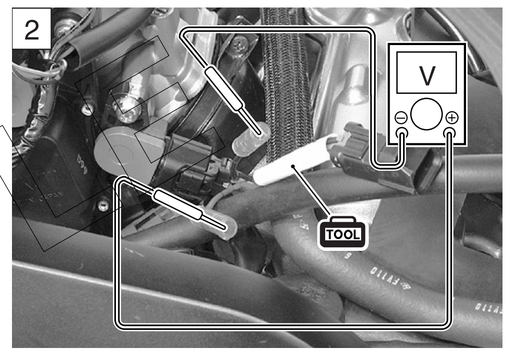
TOOL **09900-25008: Multi-circuit tester set**

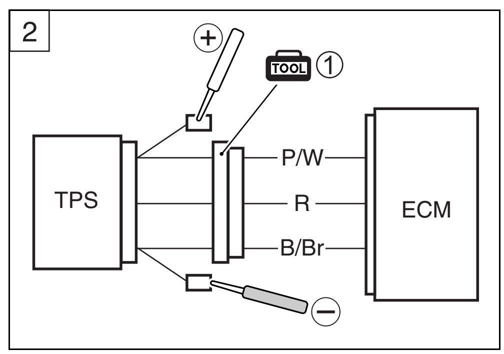
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑤ or ⑫). • Open or short circuit in the Red wire or B/Br wire.

Step 2
1) Turn the ignition switch ON.
2) Connect the test harness ① between TP sensor and wire harness.
3) Measure the TP sensor output voltage at the coupler (between ⊕ P/W and ⊖ B/Br) by turning the throttle grip.



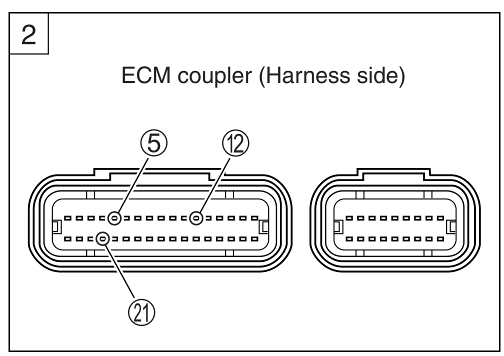


DATA **TP sensor output voltage**
Throttle valve is closed: Approx. 1.1 V
Throttle valve is opened: Approx. 4.3 V

TOOL **09900-25008: Multi-circuit tester set**
09900-28630: TPS test wire harness

Tester knob indication: Voltage (⎓)

SAMPLE



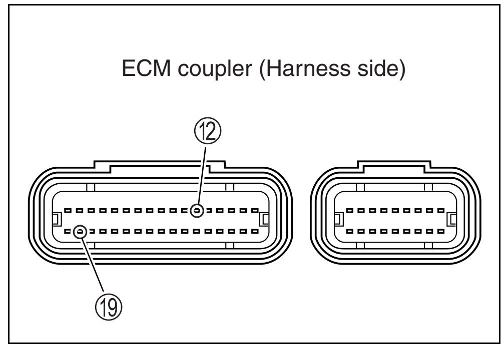
Is the voltage OK?

YES	• R, B/Br or P/W wire open or shorted to ground, or poor ⑤, ⑫ or ㉑ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Reset the TP sensor position correctly. • Replace the TP sensor with a new one.

"C15" (P0115-H/L) ECT SENSOR CIRCUIT MALFUNCTION

On model K7, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

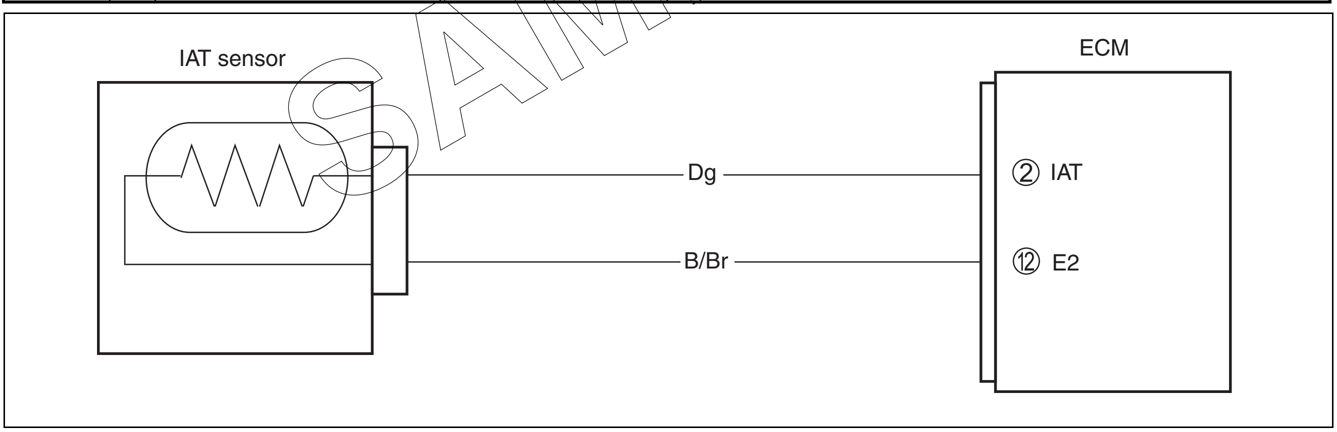
*** Refer to the SV650/S service manual 4-31 for details.**



"C21" (P0110-H/L) IAT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION			POSSIBLE CAUSE
C21 (P0110)		Output voltage is not within the following range. 0.1 ≦ Sensor voltage ≦ 4.6 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to ground.

SAMPLE

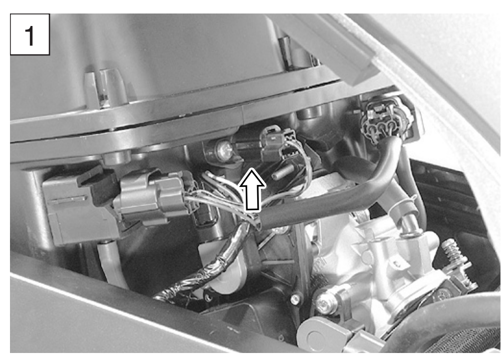


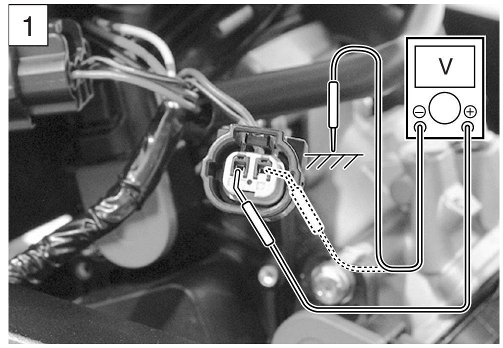
INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
3) Check the IAT sensor coupler for loose or poor contacts. If OK, then measure the IAT sensor voltage at the wire side coupler.
4) Disconnect the IAT sensor coupler and turn the ignition switch ON.





5) Measure the voltage between Dg wire terminal and ground.
6) Also, measure the voltage between Dg wire terminal and B/Br wire terminal.

DATA **IAT sensor input voltage: 4.5 – 5.5 V**
(⊕ Dg – ⊖ Ground)
(⊕ Dg – ⊖ B/Br)

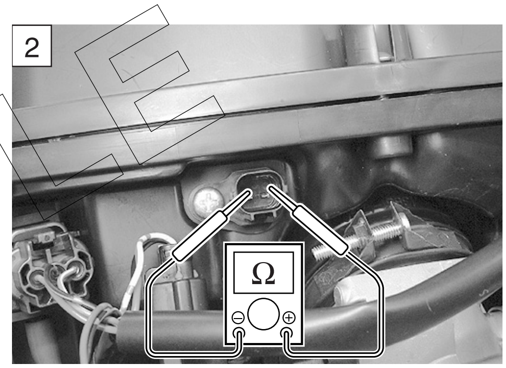
TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (Terminal ② or ⑫). • Open or short circuit in the Dg wire or B/Br wire.

Step 2
1) Turn the ignition switch OFF.
2) Disconnect the IAT sensor coupler.
3) Measure the IAT sensor resistance.



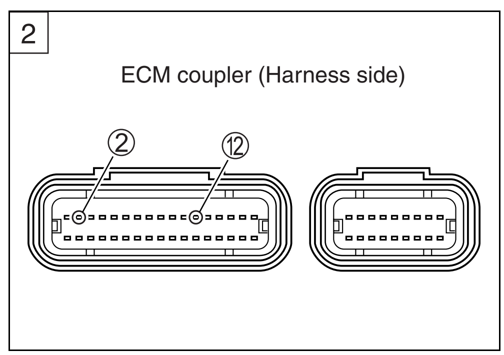
DATA **IAT sensor resistance: Approx. 2.5 kΩ at 20 °C (68 °F)**
(Terminal – Terminal)

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)

SAMPLE

Is the resistance OK?



YES	• Dg or B/Br wire open or shorted to ground, or poor ② or ⑫ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the IAT sensor with a new one.

DATA **IAT sensor specification**

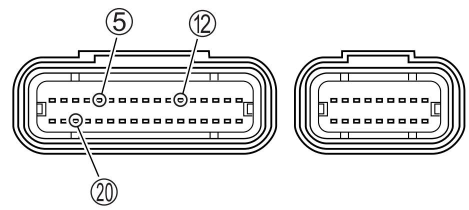
Intake Air Temp	Resistance
20 °C (68 °F)	Approx. 2.56 kΩ
40 °C (104 °F)	Approx. 1.20 kΩ
60 °C (140 °F)	Approx. 0.61 kΩ
80 °C (176 °F)	Approx. 0.33 kΩ

NOTE:
IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to SV650/S service manual 6-10 for details.

"C23" (P1651-H/L) TO SENSOR CIRCUIT MALFUNCTION

On model K7, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to the SV650/S service manual 4-35 for details.**



"C24" (P0351) or "C25" (P0352) IGNITION SYSTEM MALFUNCTION

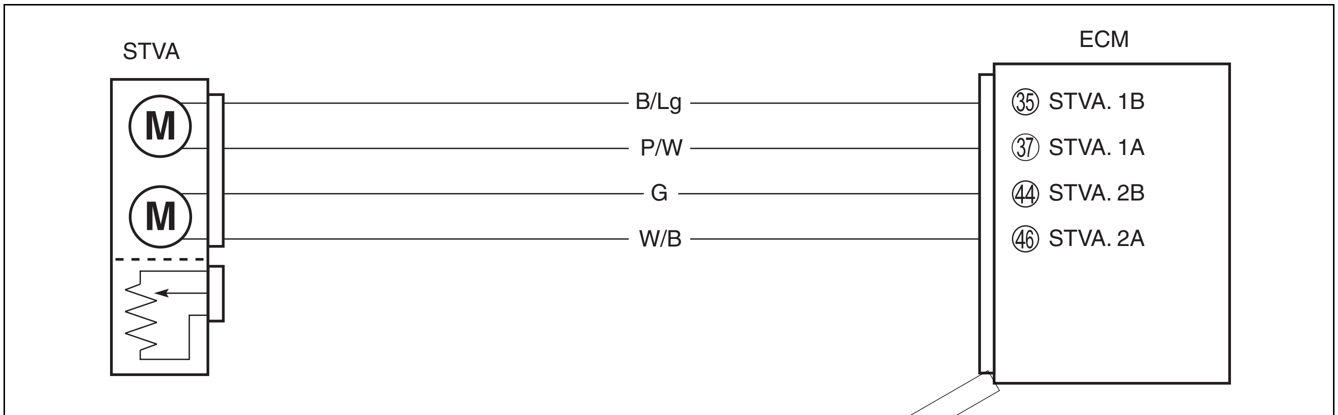
(When indicating C24/P0351 for IG coil #1)
(When indicating C25/P0352 for IG coil #2)

*** Refer to the IGNITION SYSTEM for details. (☞Page 66)**

SAMPLE

"C28" (P1655) STV ACTUATOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA.	• STVA malfunction. • STVA circuit open or short. • STVA motor malfunction.



SAMPLE

INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.

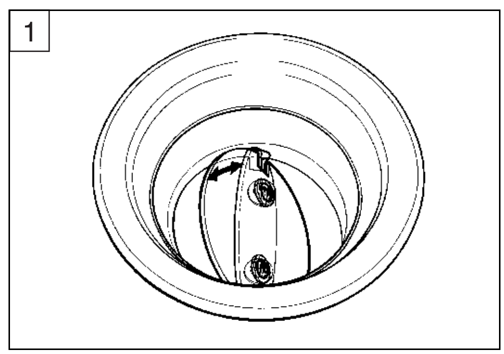
Step 1

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
3) Check the STVA coupler for loose or poor contacts.



4) Remove the air cleaner cap. (☞SV650/SK3 2-4)
5) Turn the ignition switch ON to check the STV operation. (STV operating order: Full open → 15% open)

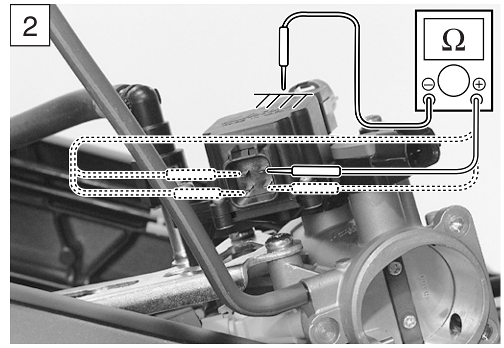
Is the operating OK?



YES	Go to Step 2.
NO	• Loose or poor contacts on the STVA coupler. • Open or short circuit in the B/Lg, P/W, G or W/B wires. • If wire and connection are OK, go to Step 2.

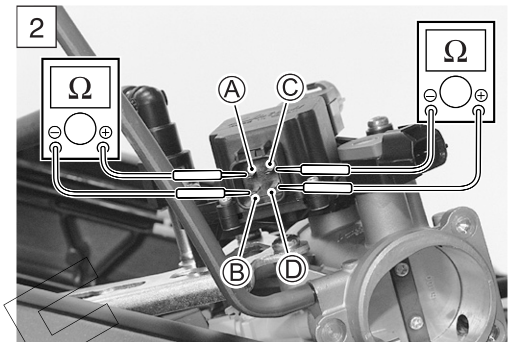
Step 2

1) Turn the ignition switch OFF.
2) Disconnect the STVA coupler and remove the throttle body. (☞Page 51)
3) Check the continuity between each terminal and ground.



DATA **STVA continuity: ∞ Ω (Infinity)**
(Terminal – Ground)

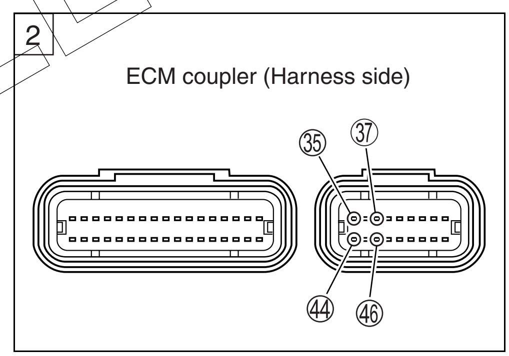
4) If OK, then measure the STVA resistance (between terminal Ⓐ and terminal Ⓑ) and (between terminal Ⓒ and terminal Ⓓ).



DATA **STVA resistance: Approx. 7 Ω**
(Terminal Ⓐ – Terminal Ⓑ)
(Terminal Ⓒ – Terminal Ⓓ)

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)



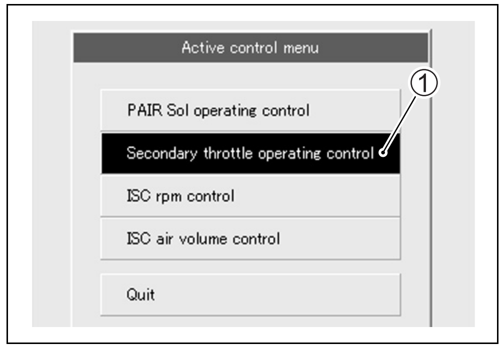
Is the resistance OK?

YES	• B/Lg, P/W, G and W/B wire open or shorted to ground, or poor ㉟, ㊲, ㊹ and ㊻ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Loose or poor contacts on the ECM coupler. • Replace the STVA with a new one.

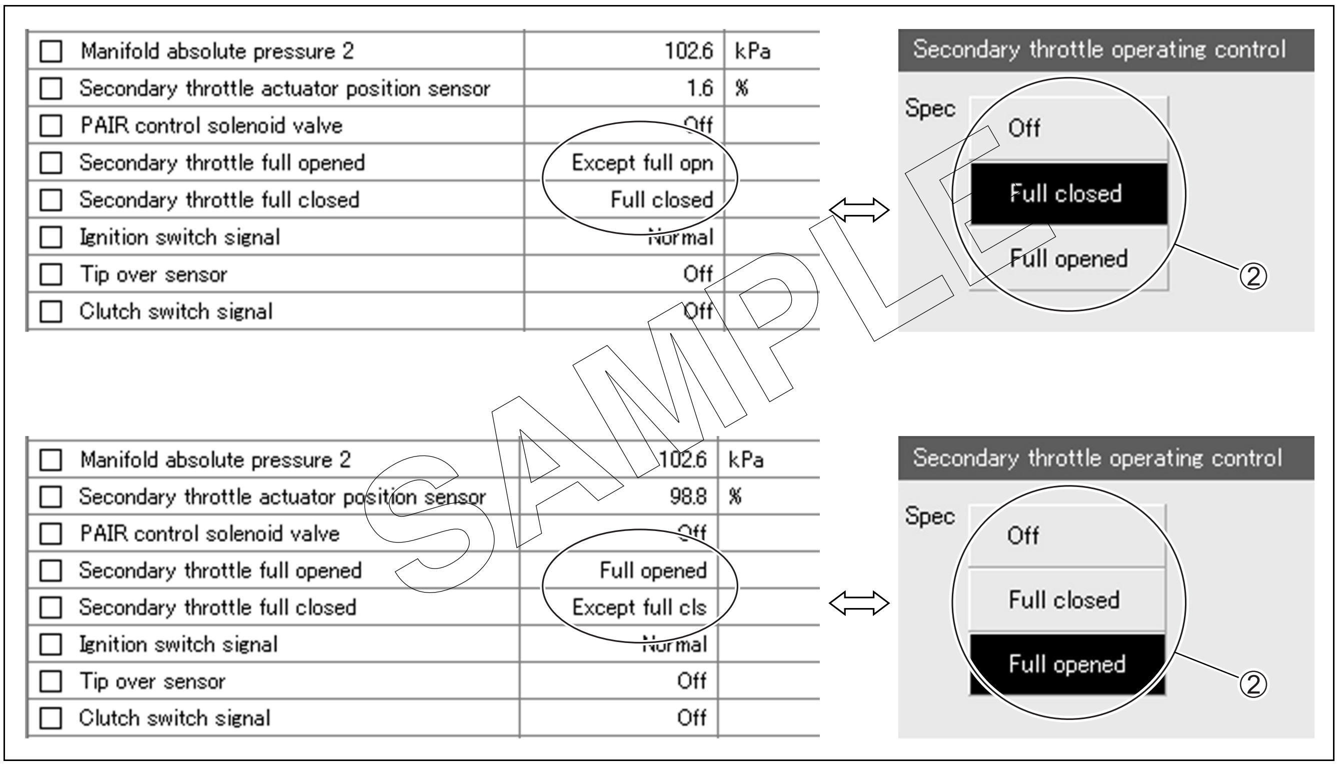
SAMPLE

ACTIVE CONTROL INSPECTION

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click "Secondary throttle operating control" ①.



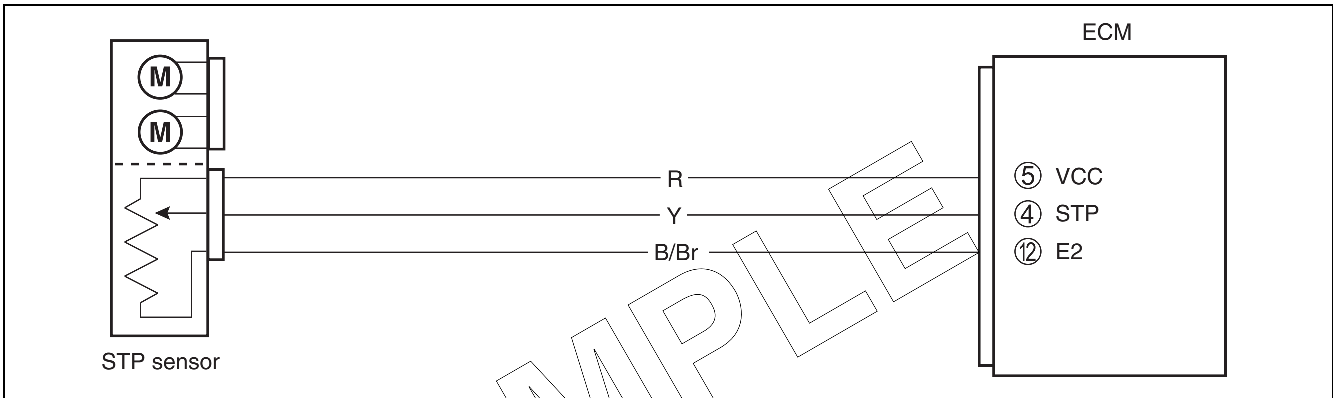
4) Click each button ②.
   At this time, if an operation sound is heard from the STVA, the function is normal.



SAMPLE

"C29" (P1654-H/L) STP SENSOR CIRCUIT MALFUNCTION

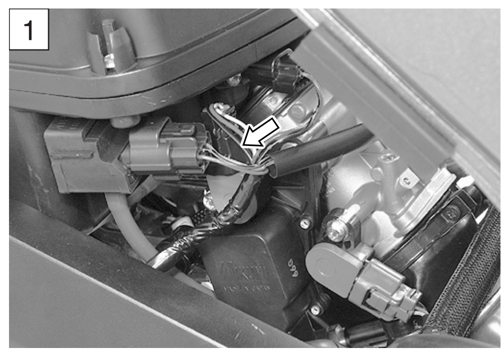
DETECTED CONDITION			POSSIBLE CAUSE
C29 (P1654)		Signal voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.1 V < Sensor voltage < 4.83 V	• STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor malfunction. • ECM malfunction.
P1654	H	Sensor voltage is higher than specified value.	• STP sensor circuit shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• STP sensor circuit open or shorted to ground or VCC circuit open.



SAMPLE

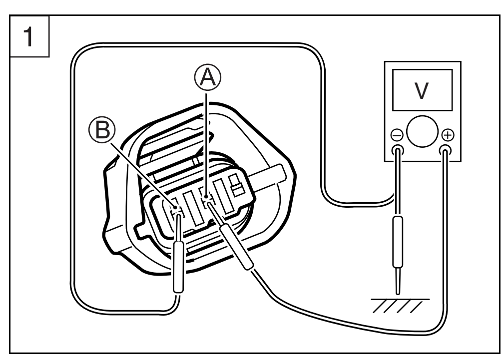
INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.



Step 1

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank with its prop stay.
   (☞SV650/SK3 5-6)
3) Check the STP sensor coupler for loose or poor contacts.
   If OK, then measure the STP sensor input voltage.
4) Disconnect the STP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire Ⓐ and ground.
7) Also, measure the voltage at the Red wire Ⓐ and B/Br wire Ⓑ.



DATA **STP sensor input voltage: 4.5 – 5.5 V**
(⊕ Red – ⊖ Ground)
(⊕ Red – ⊖ B/Br)

TOOL **09900-25008: Multi-circuit tester set**

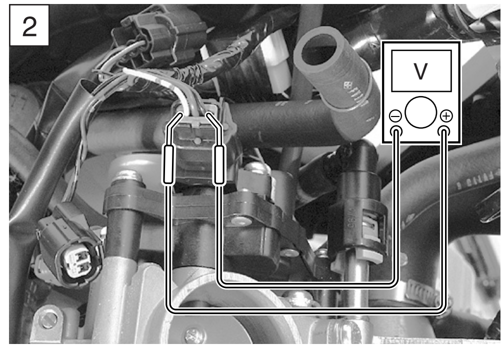
Tester knob indication: Voltage (⎓)

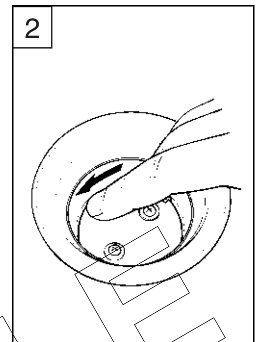
Is the voltage OK?

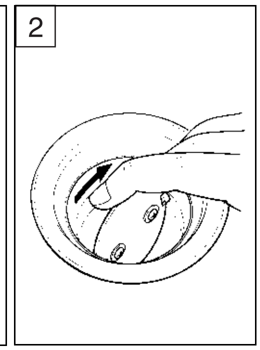
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (Terminal ⑤ or ⑫). • Open or short circuit in the Red wire or B/Br wire.

Step 2

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. (☞Page 51)
3) Connect the STP sensor coupler.
4) Insert the needle pointed probes to the STP sensor coupler.
5) Disconnect the STVA lead wire coupler.
6) Turn the ignition switch ON.
7) Measure the STP sensor output voltage at the coupler (between ⊕ Yellow wire and ⊖ B/Br wire) by turning the secondary throttle valve (close and open) with a finger.



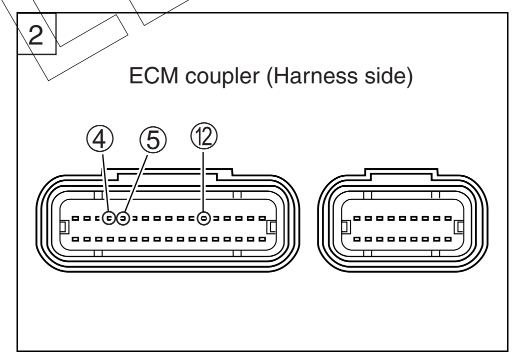




DATA **STP sensor output voltage**
Secondary throttle valve is closed: Approx. 0.6 V
Secondary throttle valve is opened: Approx. 4.5 V

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

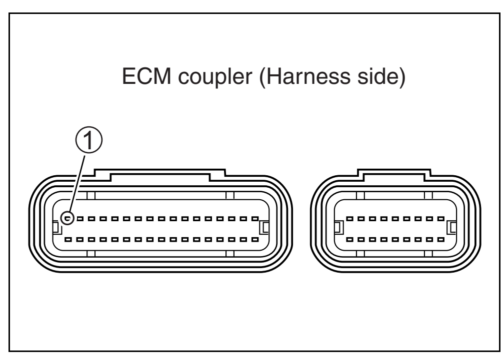
YES	• Y, R, B/Br wire open or shorted to ground, or poor ④, ⑤ or ⑫ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Reset the STP sensor position correctly. • Replace the STP sensor with a new one.

SAMPLE

"C31" (P0705) GP SWITCH CIRCUIT MALFUNCTION

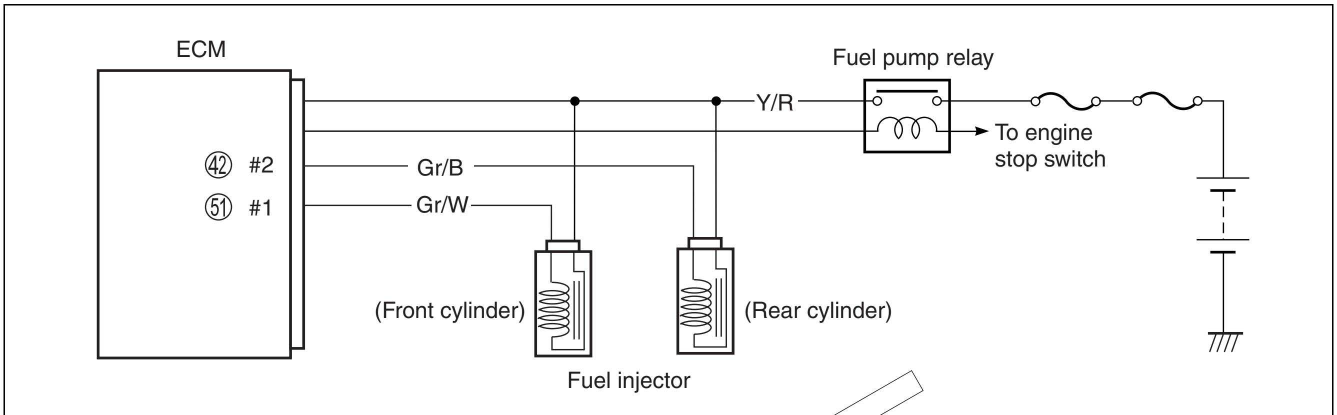
On model K7, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to the SV650/S service manual 4-41 for details.**



"C32" (P0201) or "C33" (P0202) FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
CKP signals produced but fuel injector signal is interrupted continuous by several times (Front 8 times, Rear 8 times) or more.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.



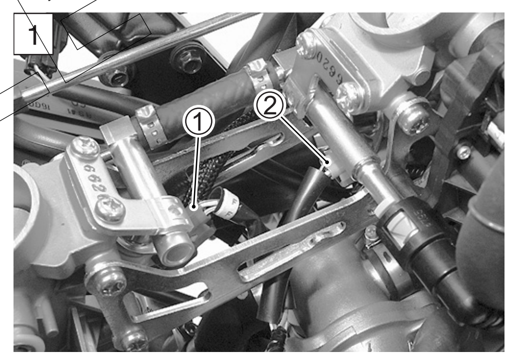
SAMPLE

INSPECTION

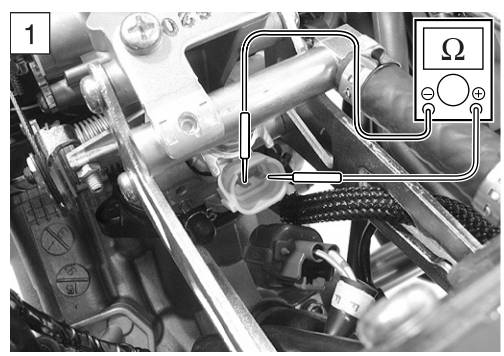
NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1
(When indicating C32/P0201 for fuel injector #1)
(When indicating C33/P0202 for fuel injector #2)

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. (☞ Page 51)
3) Check the injector coupler (Front cylinder side ① or Rear cylinder side ②) for loose or poor contacts.
   If OK, then measure the injector resistance.



4) Disconnect the injector coupler and measure the resistance between terminals.



DATA Injector resistance: 11 – 13 Ω at 20 °C (68 °F) (Terminal – Terminal)

5) If OK, then check the continuity between each terminal and ground.

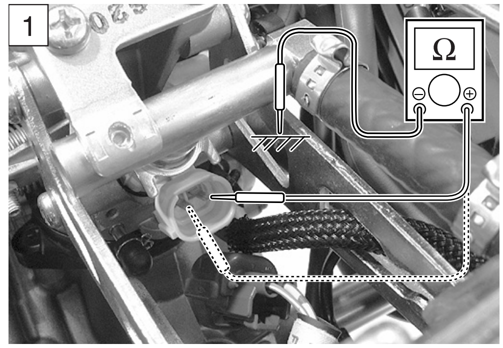
STP sensor continuity: ∞ Ω (Infinity)

09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

YES	Go to Step 2.
NO	Replace the injector with a new one. (☞Page 54)

1


Step 2

1) Turn the ignition switch ON.
2) Measure the injector voltage between Y/R wire and ground.

NOTE:
Injector voltage can be detected only 3 seconds after ignition switch is turned ON.

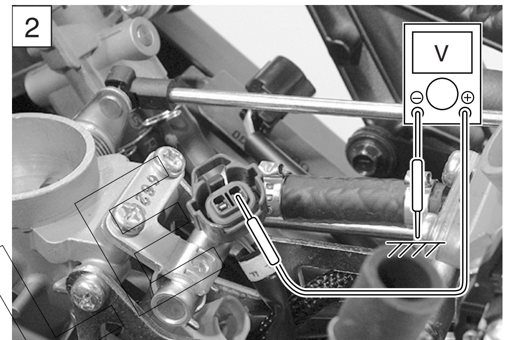
Injector voltage: Battery voltage
(⊕ Y/R – ⊖ Ground)

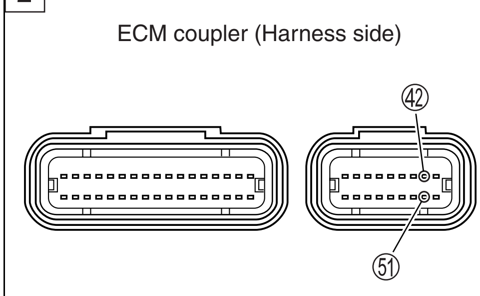
09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Gr/W wire open or shorted to ground, or poor ⑤① connection. (Front cylinder side) • Gr/B wire open or shorted to ground, or poor ④② connection. (Rear cylinder side) • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open circuit in the Y/R wire.

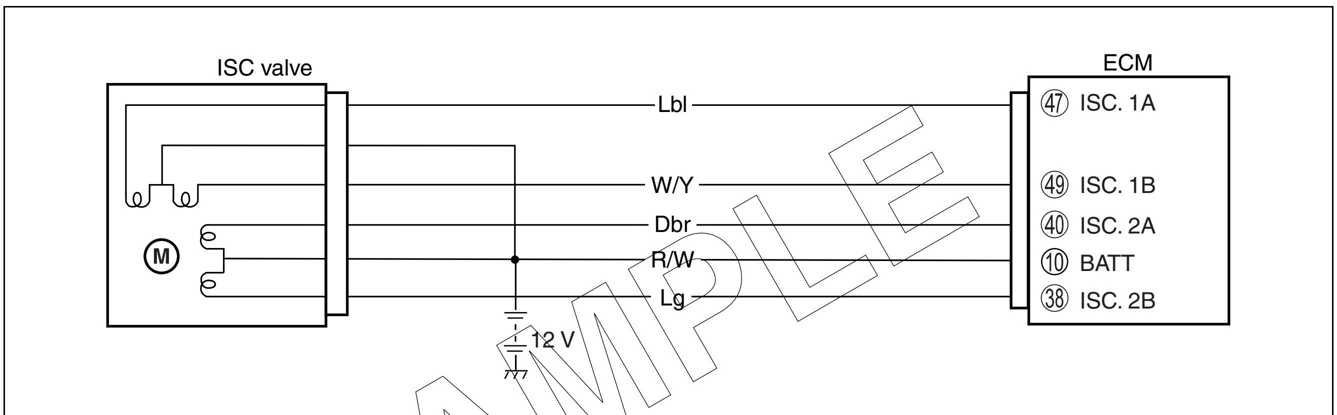
2


2


SAMPLE

"C40" (P0505 or P0506 and P0507) ISC VALVE CIRCUIT MALFUNCTION

DETECTED CONDITION		POSSIBLE CAUSE
C40 (P0505)	The circuit voltage of motor drive is unusual. Idle speed is higher than the normal condition.	• ISC valve circuit open or shorted to ground • Power source circuit open • ISC valve is fixed to full open • Disconnected ISC valve hose
C40 (P0506)	Idle speed is lower than the desired idle speed.	• Air passage clogged • ISC valve is fixed • ISC valve PRE-SET position is incorrect
C40 (P0507)	Idle speed is higher than the desired idle speed.	• Disconnected ISC valve hose • ISC valve is fixed • ISC valve PRE-SET position is incorrect



SAMPLE

CAUTION

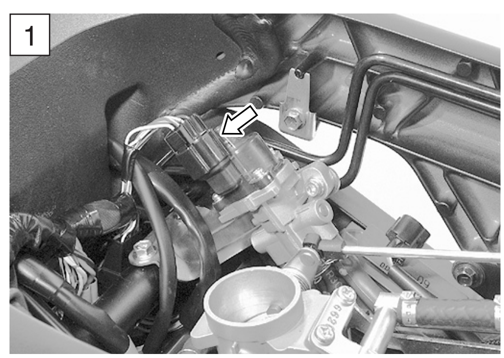
Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.
If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.

INSPECTION

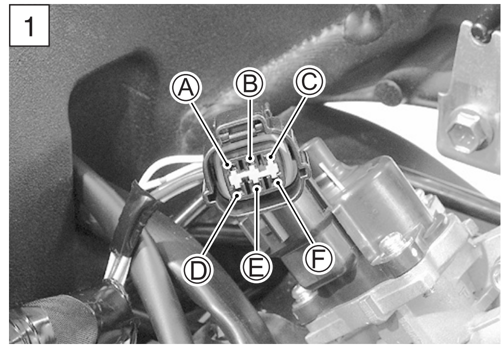
NOTE:
After repairing the trouble, clear the DTC using SDS tool.

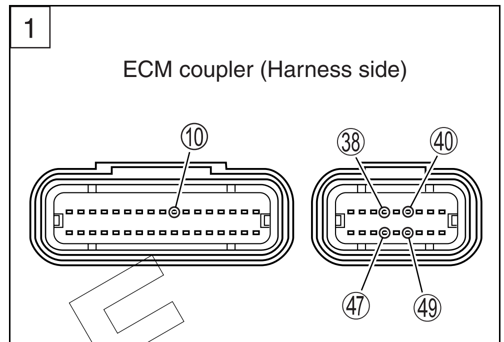
Step 1

1) Turn the ignition switch OFF.
2) Remove the air cleaner box. (☞Page 51)
3) Check the ISC valve coupler for loose or poor contacts.
   If OK, then check the ISC valve lead wire continuity.



4) Disconnect the ISC valve coupler and ECM coupler.
5) Check the continuity between terminals Ⓐ and ㊾, terminals Ⓑ and ⑩, terminals Ⓒ and ㊼, terminals Ⓓ and ㊳, terminals Ⓔ and ⑩, and terminals Ⓕ and ㊵.





CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

DATA **ISC valve wire continuity: Continuity (•)))**

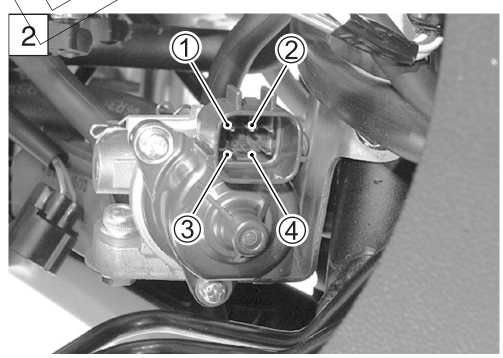
TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))

Is the continuity OK?

YES	Go to Step 2.
NO	Lbl, W/Y, Dbr, R/W or Lg wire open.

Step 2
1) Turn the ignition switch OFF.
2) Disconnect the ISC valve coupler.
3) Check the continuity between terminals ① and ③, terminals ② and ④.



DATA **ISC valve continuity: Approx. ∞ Ω (Infinity)**
(Terminal ① – Terminal ③)
(Terminal ② – Terminal ④)

4) If OK, then measure the resistance between terminals ① and ②, terminals ③ and ④.

DATA **ISC valve resistance: Approx. 30 ± 1.2 Ω at 20 °C (68 °F)**
(Terminal ① – Terminal ②)
(Terminal ③ – Terminal ④)

Is the resistance OK?

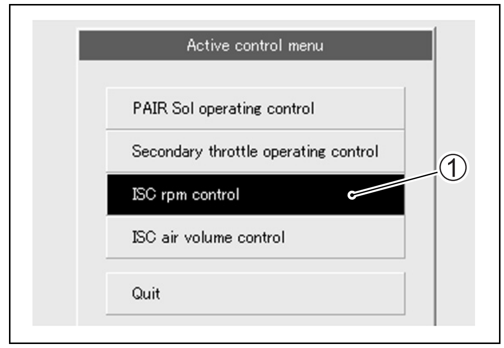
YES	If wire is OK, intermittent trouble or faulty ECM.
NO	Replace the ISC valve with a new one.

SAMPLE

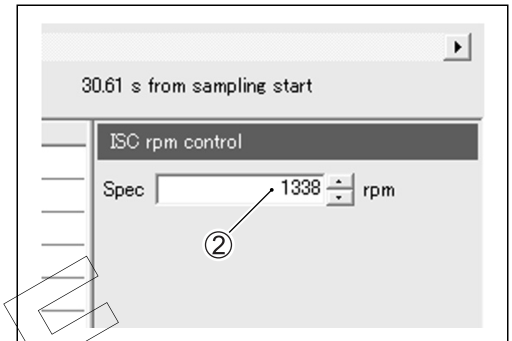
ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)

Check 1

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Check that the engine is running.
3) Click the "Active control".
4) Click the "ISC rpm control" ①.



5) Check that the "Spec" ② is idle speed 1 300 ± 100 rpm.
6) Check that the "Desired idle speed" ③ is within the specified idle rpm.

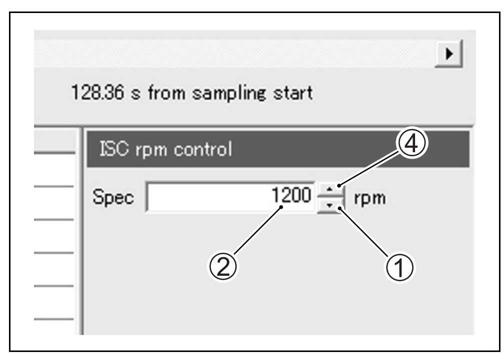


Item	Value	Unit
Engine speed	1380	rpm
Engine coolant / oil temperature	94.0	℃
Intake air temperature	37.0	℃
Throttle position	27.9	°
Desired idle speed	③ 1343	rpm
ISC valve position	65	step
Manifold absolute pressure 1	58.5	kPa
Battery voltage	14.4	V

SAMPLE

Check 2

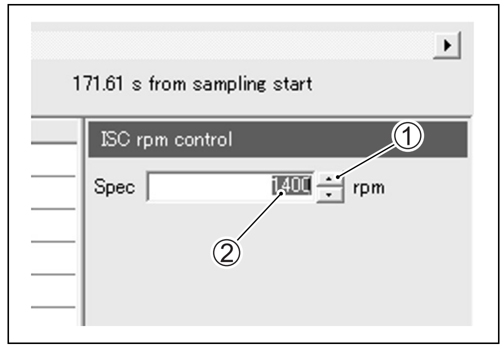
1) Click the button ① and decrease the "Spec" ② to 1 200 rpm slowly.
2) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. At the same time, check that the number of steps in the ISC valve position decreases.
3) Click the button ④ and increase the "Spec" ② slowly.
4) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. Also, check that the number of steps ⑤ in the ISC valve position increases.



Item	Value	Unit
Engine speed	1192	rpm
Engine coolant / oil temperature	94.0	℃
Intake air temperature	33.0	℃
Throttle position	27.9	°
Desired idle speed	③ 1205	rpm
ISC valve position	⑤ 58	step
Manifold absolute pressure 1	61.4	kPa
Battery voltage	14.1	V

Check 3

1) Click the button ① and increase the "Spec" ② to 1 400 rpm slowly.
2) Check that the "Desired idle speed" ③ is nearly equal to the "Spec" ②. Also, check that the number of steps ④ in the ISC valve position increases.



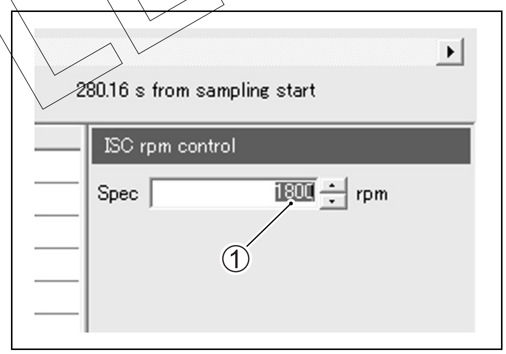
Item	Value	Unit
Engine speed	1380	rpm
Engine coolant / oil temperature	99.0	℃
Intake air temperature	43.0	℃
Throttle position	27.9	°
Desired idle speed	③ 1405	rpm
ISC valve position	④ 66	step
Manifold absolute pressure 1	38.2	kPa
Battery voltage	14.4	V

Check 4

1) Increase the "Spec" ① to 1 800 rpm.
2) Check that the "Desired idle speed" ② is approx. 1 800 rpm.
3) Check that the "Engine speed" ③ is close to 1 800 rpm.

NOTE:
Be careful not to increase the "Spec" to more than 1 800 rpm, or the "Engine speed" may reach the upper limit.

SAMPLE



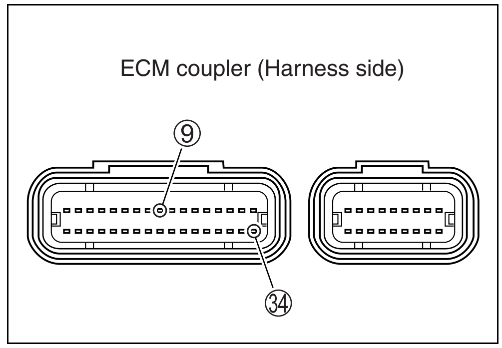
Item	Value	Unit
Engine speed	③ 1882	rpm
Engine coolant / oil temperature	100.0	℃
Intake air temperature	46.0	℃
Throttle position	27.9	°
Desired idle speed	② 1807	rpm
ISC valve position	75	step
Manifold absolute pressure 1	39.1	kPa
Battery voltage	14.1	V

If the ISC valve does not function properly, replace the ISC valve or inspect the ISC valve. (☞Page 64)

"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

On model K7, the connector terminals to be used for checking sensors for voltage, resistance or continuity at the ECM terminal are located as shown in the illustration.

*** Refer to the SV650/S service manual 4-44 for details.**



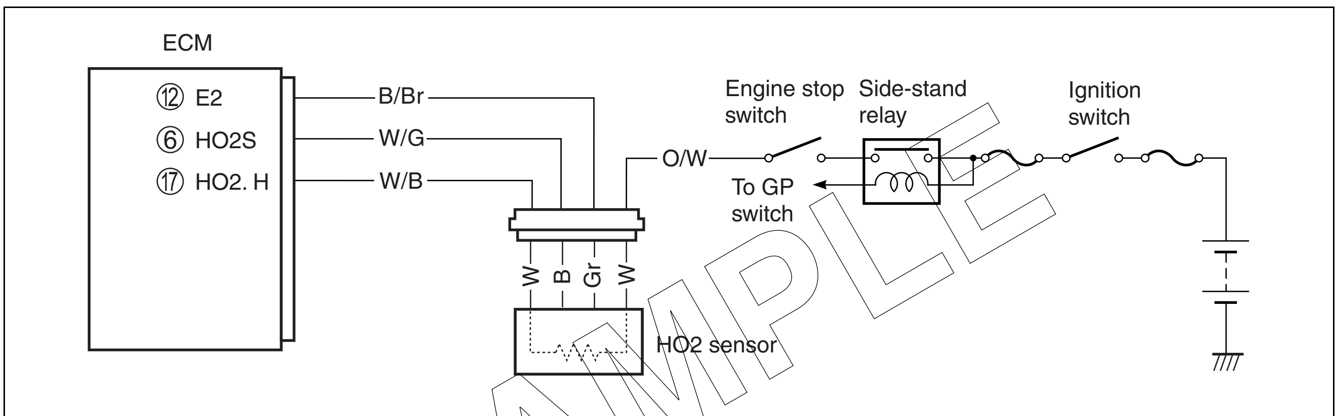
"C42" (P01650) IG SWITCH CIRCUIT MALFUNCTION

*** Refer to the SV650/S service manual 8-47 for details.**

SAMPLE

"C44" (P0130/P0135) HO2 SENSOR (HO2S) CIRCUIT MALFUNCTION (FOR E-02, 19, 24, 33)

DETECTED CONDITION		POSSIBLE CAUSE
C44 (P0130)	After engine is started few minutes. (Sensor output voltage ≧ 2.5 V) Engine is cold and stopped. (Sensor output voltage < 0.1 V) In other than the above value, C44 (P0130) is indicated.	• HO2 sensor circuit open or shorted to ground. • Fuel system malfunction. • ECM malfunction.
C44 (P0135)	The heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit.	• Battery voltage supply to the HO2 sensor.



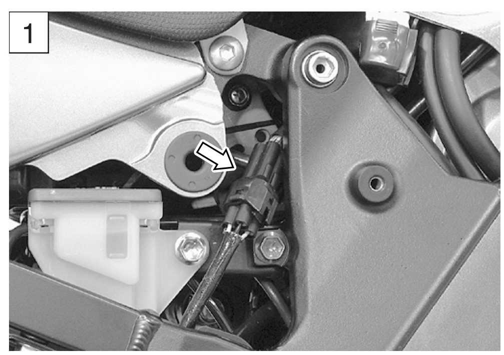
SAMPLE

INSPECTION

NOTE:
After repairing the trouble, clear the DTC using SDS tool.

Step 1 (When indicating C44/P0130:)

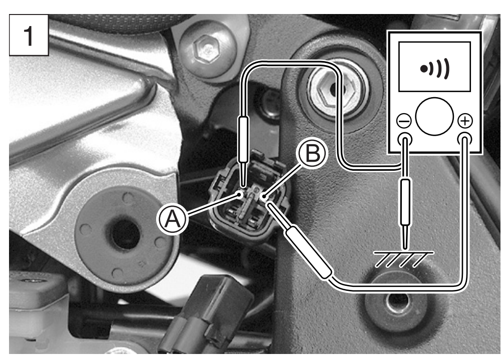
1) Turn the ignition switch OFF.
2) Remove the right frame side cover. (☞SV650/SK3 7-4)
3) Check the HO2 sensor for loose or poor contacts.
   If OK, then check the HO2 sensor lead wire continuity.



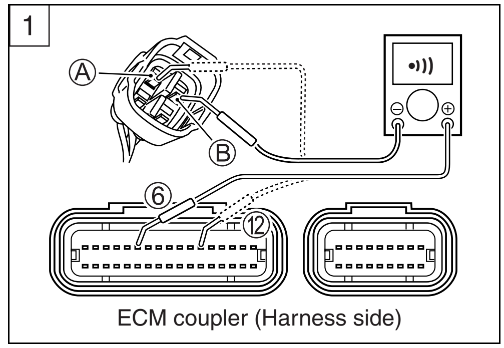
4) Disconnect the HO2 sensor coupler.
5) Check the continuity between W/G wire Ⓐ and ground.
6) Also, check the continuity between W/G wire Ⓐ and B/Br wire Ⓑ. If the sound is not heard from the tester, the circuit condition is OK.

09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•)))



7) Remove the front seat. (☞SV650/SK3 7-4)
8) Disconnect the ECM coupler.
9) Check the continuity between W/G wire Ⓐ and terminal ⑥.
10) Also, check the continuity between B/Br wire Ⓑ and terminal ⑫.



ECM coupler (Harness side)

CAUTION

When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

DATA **HO2 sensor lead wire continuity: Continuity (•)))**

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

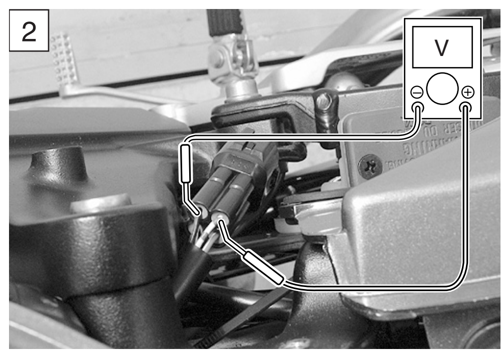
Tester knob indication: Continuity test (•)))

Is the continuity OK?

YES	Go to Step 2. (When indicating C44/P0130:)
NO	W/G wire shorted to ground, or W/G or B/Br wire open.

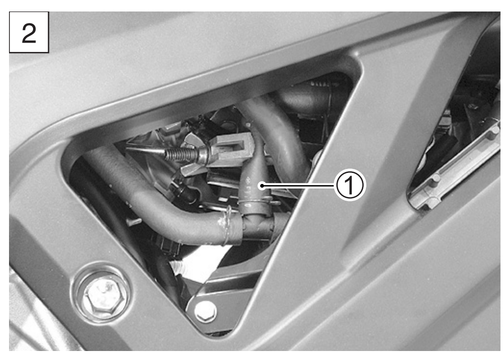
SAMPLE

Step 2 (When indicating C44/P0130:)
1) Connect the ECM coupler and HO2 sensor coupler.
2) Warm up the engine enough.
3) Measure the HO2 sensor output voltage between W/G wire and B/Br wire, when idling condition.



DATA **HO2 sensor output voltage at idle speed:**
0.3 V and less (⊕ W/G – ⊖ B/Br)

4) If OK, then pinch the PAIR hose ① with a proper hose clamp.
5) Measure the HO2 sensor output voltage while holding the engine speed at 5 000 r/min.



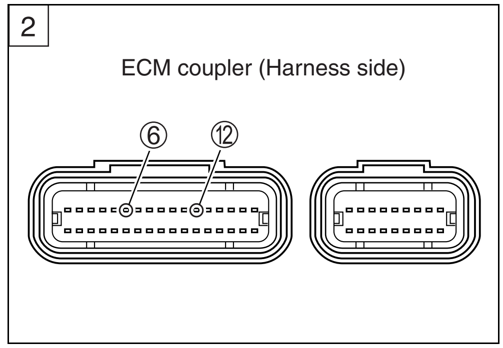
DATA **HO2 sensor output voltage at 5 000 r/min:**
0.6 V and more (⊕ W/G – ⊖ B/Br)

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

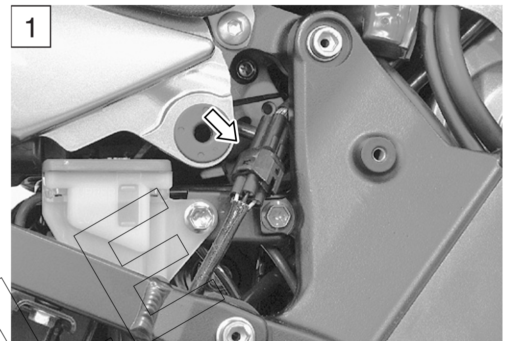
Is the voltage OK?

YES	• W/G wire or B/Br wire open or shorted to ground, or poor ⑥ or ⑫ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Replace the HO2 sensor with a new one.



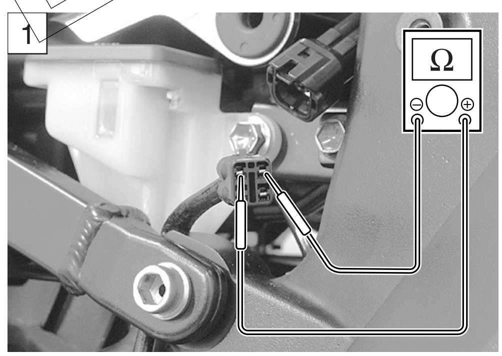
Step 1 (When indicating C44/P0135:)

1) Turn the ignition switch OFF.
2) Remove the right frame side cover. (☞SV650/SK3 7-4)
3) Check the HO2 sensor for loose or poor contacts.
   If OK, then measure the HO2 sensor resistance.



4) Disconnect the HO2 sensor coupler and measure the resistance between terminals.

NOTE:
* *Temperature of the sensor affects resistance value largely.*
* *Make sure that the sensor heater is at correct temperature.*



DATA **HO2 heater resistance: 6.5 – 9.5 Ω at 23 °C (73.4 °F) (White – White)**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)

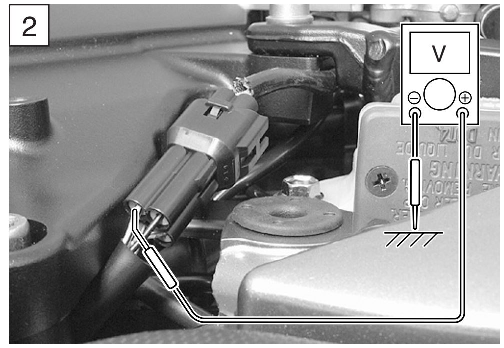
Is the voltage OK?

YES	Go to Step 2.
NO	Replace the HO2 sensor with a new one.

SAMPLE

Step 2 (When indicating C44/P0135:)

1) Connect the HO2 sensor coupler.
2) Insert the needle pointed probes to the HO2 sensor coupler.
3) Turn the ignition switch ON and measure the heater voltage between W/B wire and ground.
4) If the tester voltage indicates the battery voltage, it is good condition.



DATA **Heater voltage: Battery voltage**
(⊕ W/B – ⊖ Ground)

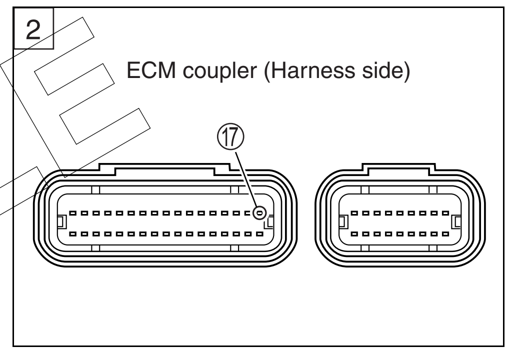
NOTE:
Battery voltage can be detected only before starting the engine.

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

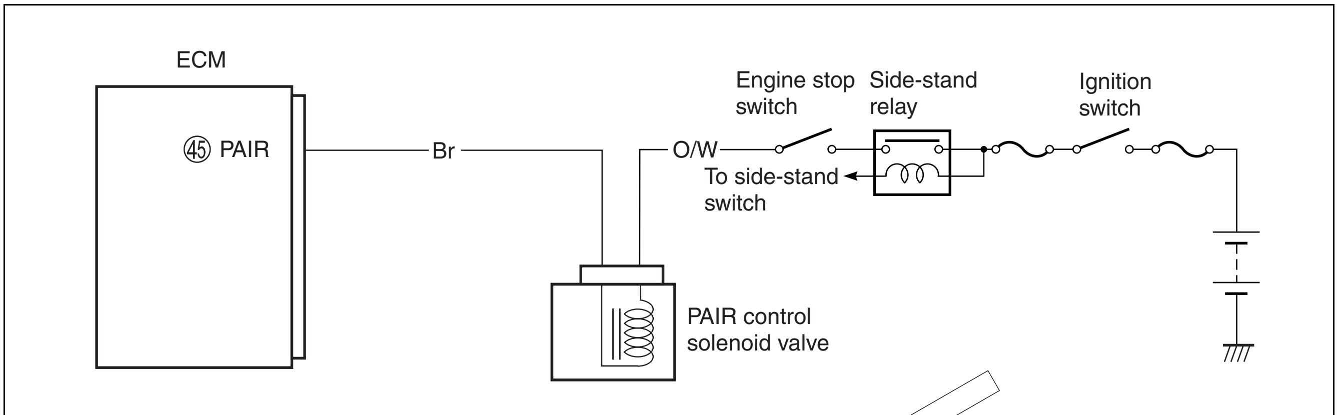
YES	• O/W or W/B wire open or shorted to ground, or poor ⑰ connection. • Recheck each terminal and wire harness for open circuit and poor connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Replace the ECM with a known good one, and inspect it again.
NO	• Open or short circuit in the W/B wire or O/W wire. • Loose or poor contacts on the ECM coupler (terminal ⑰) or HO2 sensor coupler.



SAMPLE

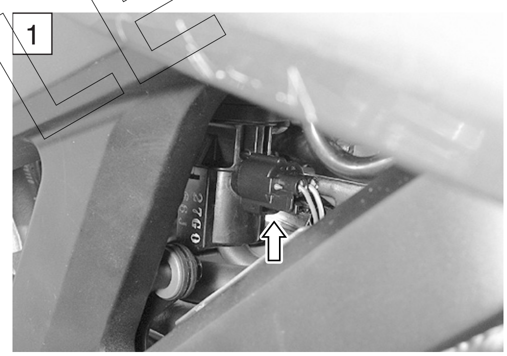
"C49" (P1656) PAIR CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
PAIR control solenoid valve voltage is not input to ECM.	• PAIR control solenoid valve circuit open or short. • PAIR control solenoid valve malfunction. • ECM malfunction.



INSPECTION

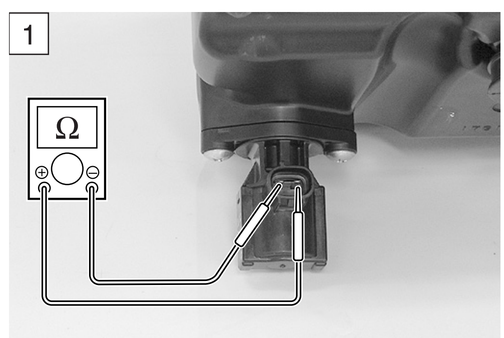
NOTE:
After repairing the trouble, clear the DTC using SDS tool.



Step 1

1) Turn the ignition switch OFF.
2) Check the PAIR control solenoid valve coupler for loose or poor contacts.
   If OK, then measure the PAIR control solenoid valve resistance.

SAMPLE



3) Remove the air cleaner box. (☞Page 51)
4) Disconnect the PAIR control solenoid valve coupler and measure the resistance between terminals.

DATA **PAIR control solenoid valve resistance:**
18 – 22 Ω at 20 – 30 °C (68 – 86 °F)

TOOL **09900-25008: Multi-circuit tester set**

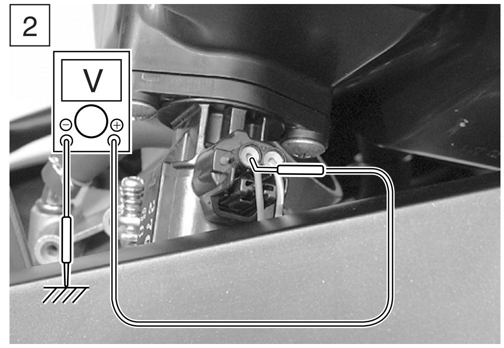
Tester knob indication: Resistance (Ω)

Is the resistance OK?

YES	Go to Step 2
NO	• Loose or poor contacts on the ECM coupler. • Replace the PAIR control solenoid valve with a new one.

Step 2

1) Connect the PAIR control solenoid valve coupler.
2) Turn the ignition switch ON.
3) Insert the needle pointed probes to the PAIR control solenoid valve coupler.
4) Measure the voltage at the wire side coupler between Brown wire and ground.



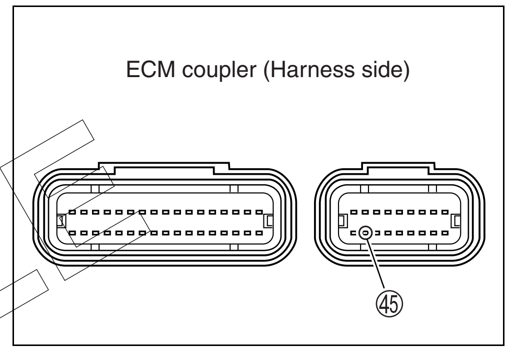
DATA **PAIR control solenoid valve voltage: Battery voltage (⊕ O/W – ⊖ Ground)**

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

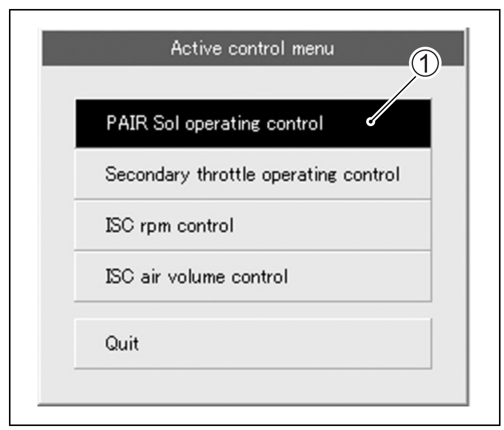
Is the voltage OK?

YES	• Brown wire open or shorted to ground, or ㊺ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open or short circuit in the O/W wire.

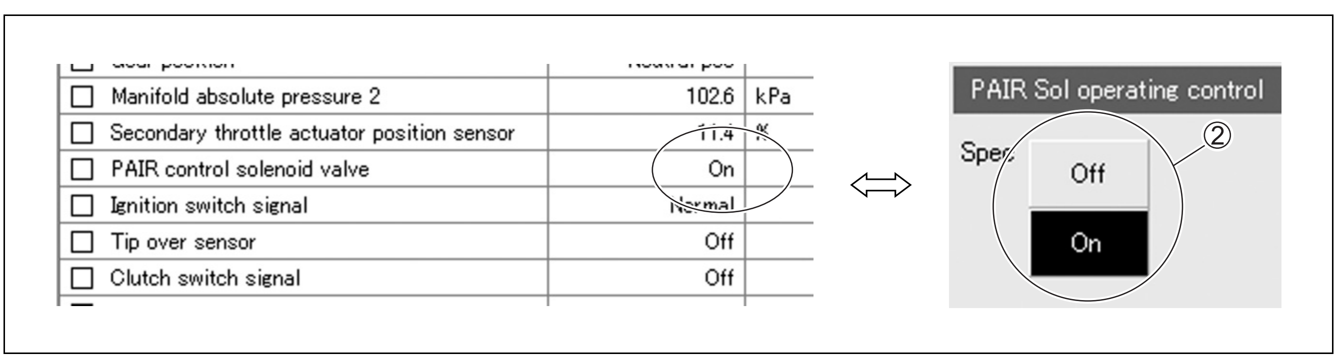


ACTIVE CONTROL INSPECTION

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click "PAIR Sol operating control" ①.

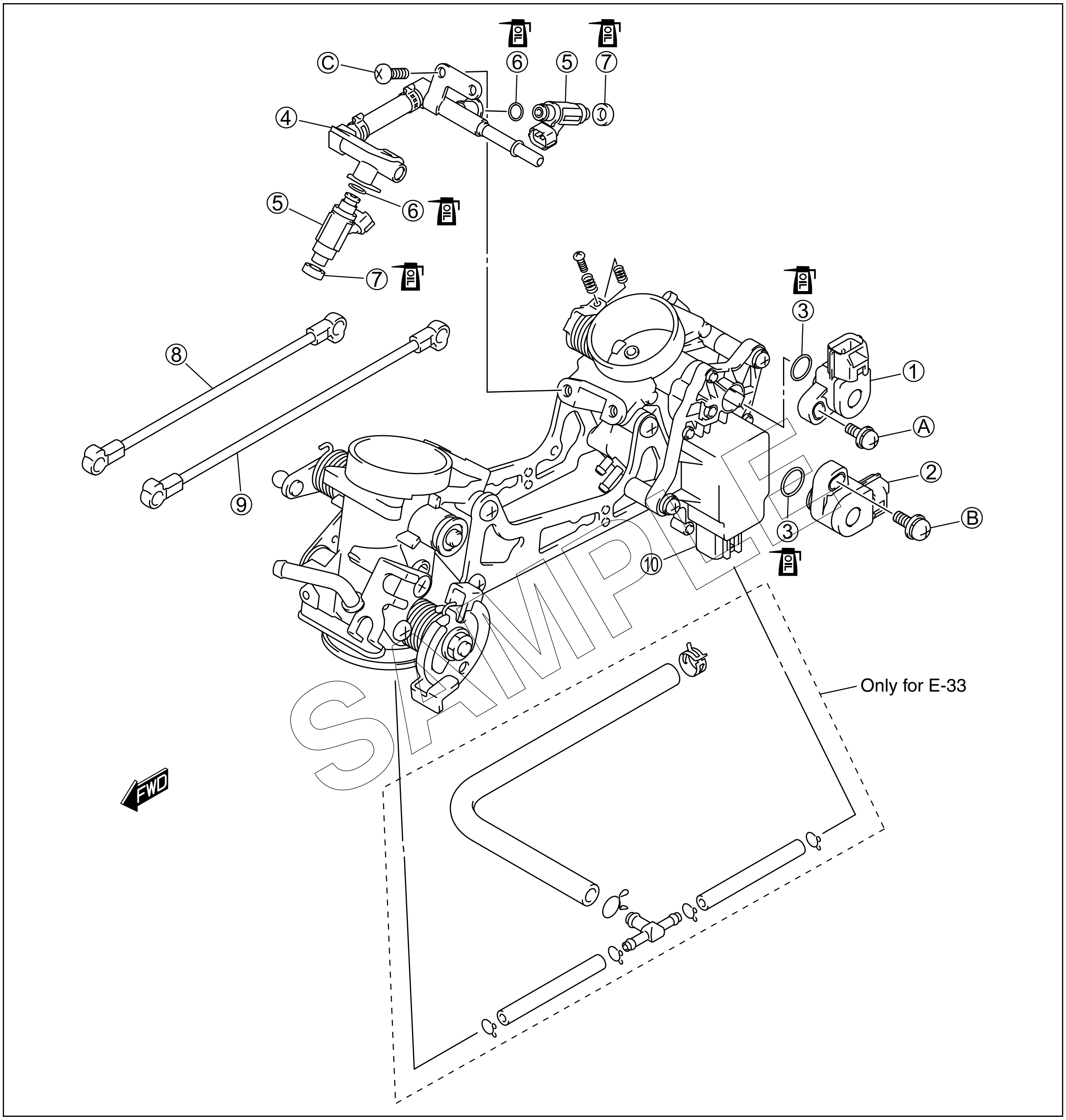


4) Click each button ②.
At this time, if an operation sound is heard from the PAIR control solenoid valve, the function is normal.



SAMPLE

THROTTLE BODY
CONSTRUCTION

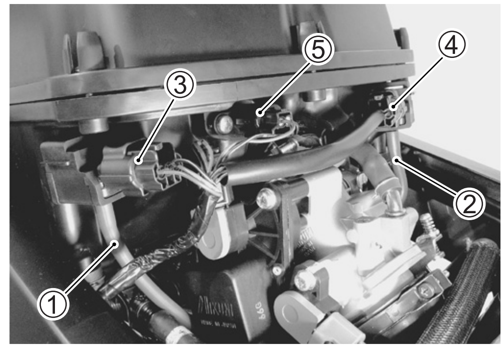


①	STP sensor	⑧	Secondary throttle link rod
②	TP sensor	⑨	Throttle link rod
③	O-ring	⑩	STVA
④	Fuel delivery pipe/hose	Ⓐ	STP sensor mounting screw
⑤	Fuel injector	Ⓑ	TP sensor mounting screw
⑥	O-ring	Ⓒ	Fuel delivery pipe mounting screw
⑦	Cushion seal		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	3.5	0.35	2.5
Ⓑ	3.5	0.35	2.5
Ⓒ	5	0.5	3.5

AIR CLEANER AND THROTTLE BODY REMOVAL

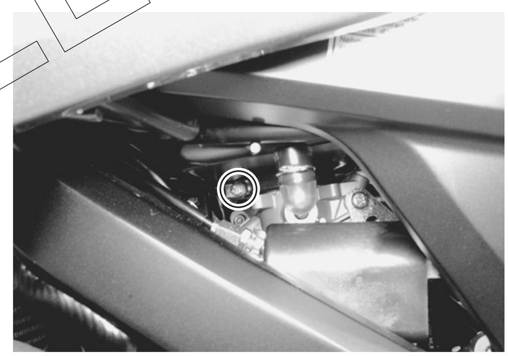
AIR CLEANER BOX



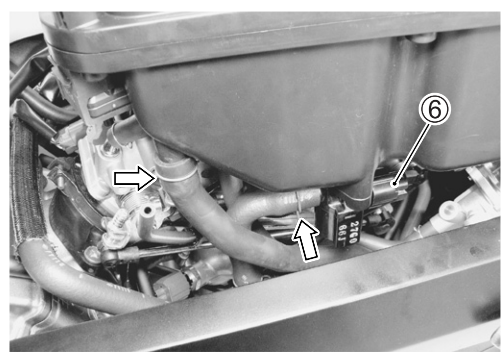
- Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
- Remove the IAP sensor vacuum hoses (①, ②).
- Disconnect the IAP sensor (R) coupler ③.
- Disconnect the IAP sensor (F) coupler ④.
- Disconnect the IAT sensor coupler ⑤.



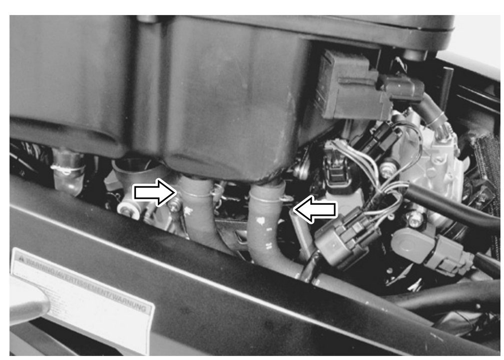
- Loosen the throttle body clamp screws.
- Move the air cleaner box.



SAMPLE



- Disconnect the PAIR hose and ISC valve hose.
- Disconnect the PAIR lead wire coupler ⑥.



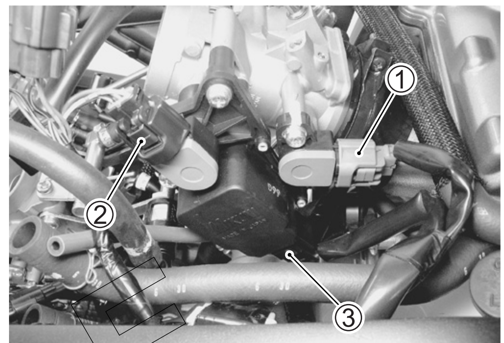
- Disconnect the crankcase breather hoses.
- Remove the air cleaner box.

THROTTLE BODY

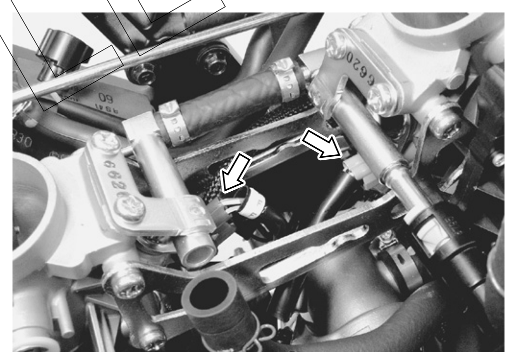
• Disconnect the fuel hose.



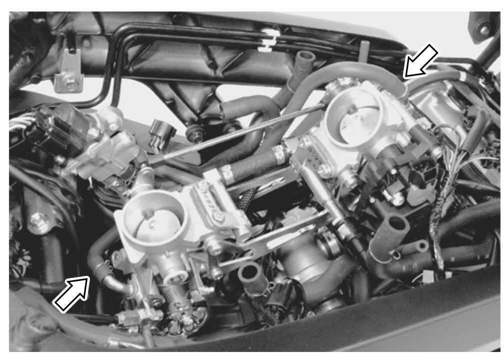
• Disconnect the various lead wire couplers.
① TP sensor
② STP sensor
③ STVA



• Remove the injector lead wire couplers.



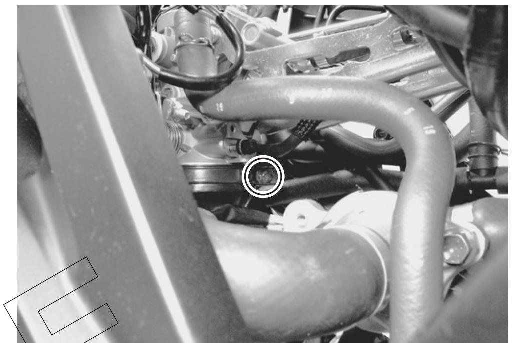
• Disconnect the ISC valve hoses.



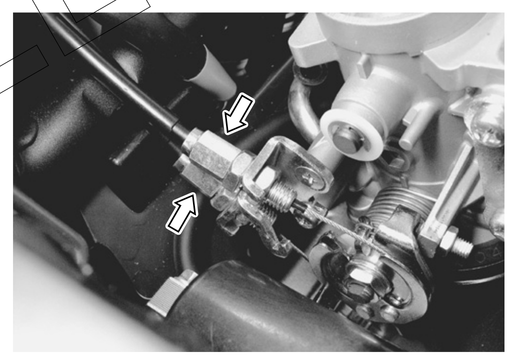
SAMPLE

- Loosen the throttle body clamp screws.





- Disconnect the throttle cables from their drum.
- Dismount the throttle body assembly.



CAUTION

*** Be careful not to damage the throttle cable bracket and fast idle lever when dismounting or remounting the throttle body assembly.**
*** After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.**

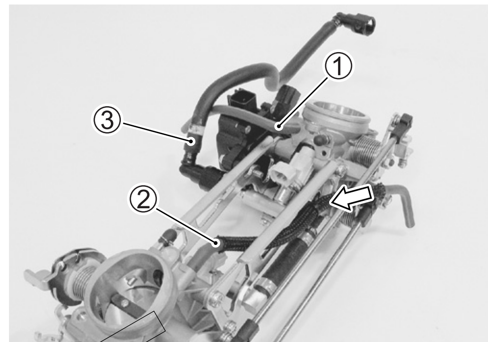
SAMPLE

THROTTLE BODY DISASSEMBLY

CAUTION

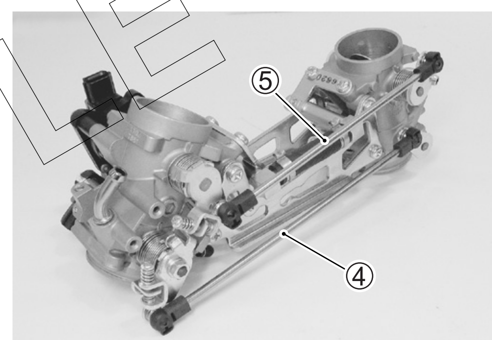
* **Be careful not to damage the throttle lever when disassembling the throttle body.**
* **The throttle body is assembled precisely in factory. Do not disassemble it other than shown in this manual.**

- Remove the clamp.
- Remove the vacuum hoses (①, ②).
- Disconnect the fuel feed hose ③.



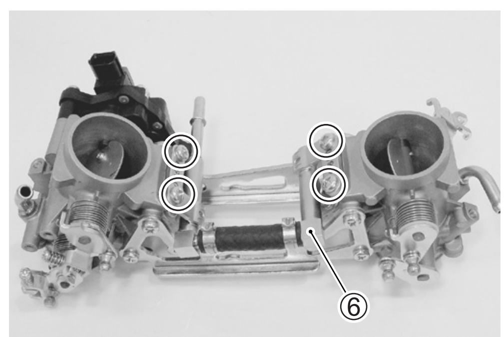
- Remove the throttle link rod ④ and secondary throttle link rod ⑤.

NOTE:
The throttle link rod ④ is longer than the secondary throttle link rod ⑤.

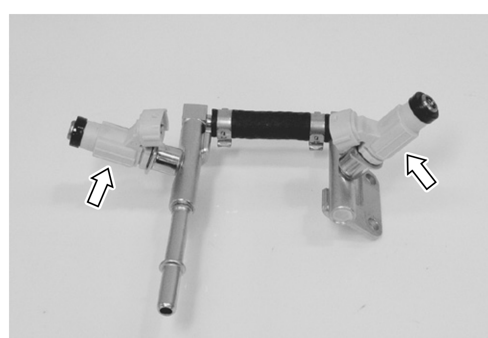


SAMPLE

- Remove the fuel delivery pipe/hose ⑥.

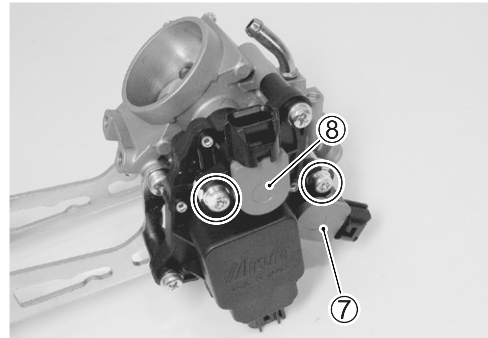


- Remove the fuel injectors.

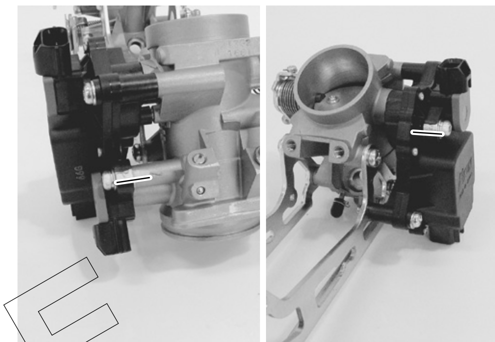


- Remove the TP sensor ⑦ and STP sensor ⑧ with the special tool.

TOOL **09930-11950: Torx wrench**

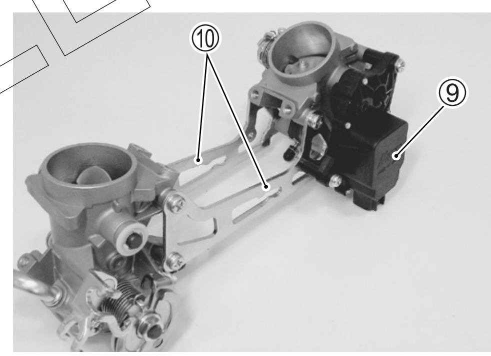


NOTE:
Prior to disassembly, mark each sensor's original position with a paint or scribe for accurate reinstallation.



CAUTION

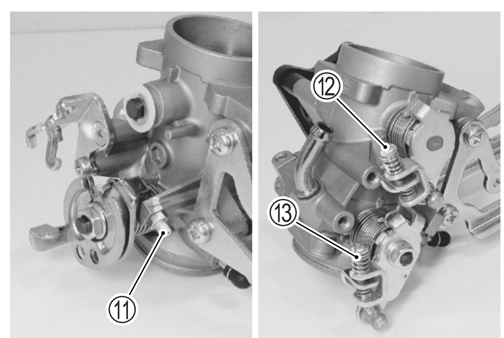
Never remove the STVA ⑨ and throttle body link plates ⑩.



SAMPLE

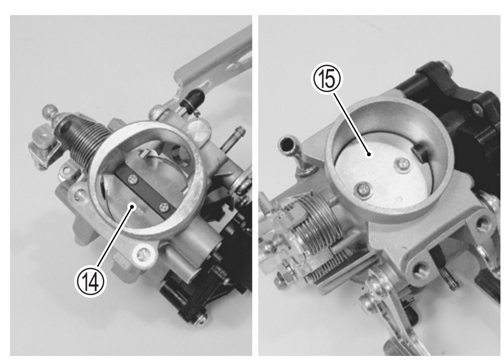
CAUTION

These adjusting screws (⑪, ⑫, ⑬) are factory-adjusted at the time of delivery and therefore avoid removing or turning them unless otherwise necessary.



CAUTION

Never remove the throttle valve ⑭ and secondary throttle valve ⑮.



THROTTLE BODY CLEANING

⚠ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions for proper use, handling and storage.

- Clean all passageways with a spray-type carburetor cleaner and blow dry with compressed air.

CAUTION

*** Never clean the main bore of throttle body to prevent come off molybdenum from the throttle valve.**
*** Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.**

SAMPLE

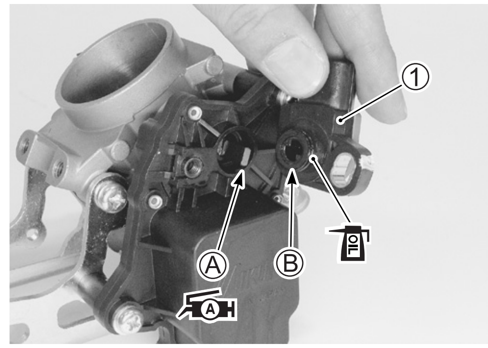
INSPECTION

Check following items for any damage or clogging.

* O-ring
* Throttle valve
* Secondary throttle valve
* Vacuum hose
* Delivery pipe/hose
* Injector cushion seal

THROTTLE BODY REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:



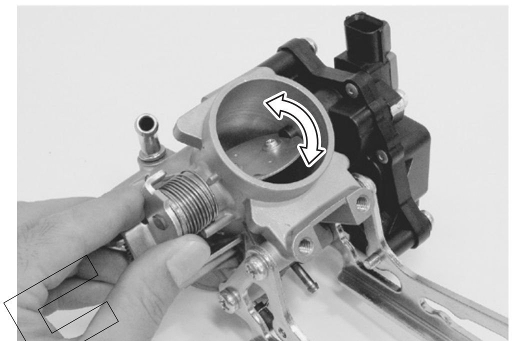
- With the STV fully closed, install the STP sensor ① and tighten the STP sensor mounting screw to the specified torque.

NOTE:
** Apply thin coat of the engine oil to the O-ring.*
** Align the secondary throttle shaft end Ⓐ with the groove Ⓑ of STP sensor.*
** Apply SUZUKI SUPER GREASE "A" to the secondary throttle shaft end Ⓐ if necessary.*

99000-25010: SUZUKI SUPER GREASE "A" (or equivalent)

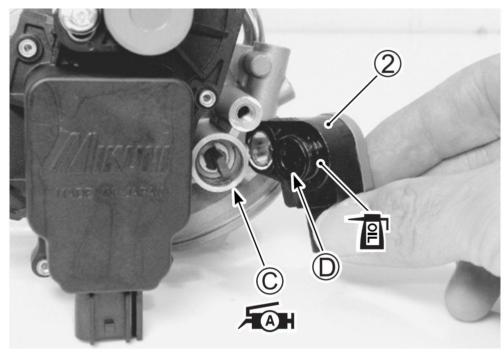
TOOL 09930-11950: Torx wrench

STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



NOTE:
** Make sure the STP valve open or close smoothly.*
** If the STP sensor adjustment is necessary, refer to page 59 for STP sensor setting procedure.*

SAMPLE



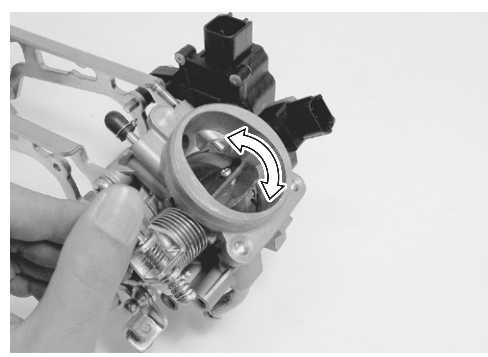
- With the throttle valve fully closed, install the TP sensor ② and tighten the TP sensor mounting screw to the specified torque.

NOTE:
** Apply thin coat of the engine oil to the O-ring.*
** Align the throttle shaft end Ⓒ with the groove Ⓓ of TP sensor.*
** Apply SUZUKI SUPER GREASE "A" to the throttle shaft end Ⓒ if necessary.*

99000-25010: SUZUKI SUPER GREASE "A" (or equivalent)

TOOL 09930-11950: Torx wrench

TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lb-ft)

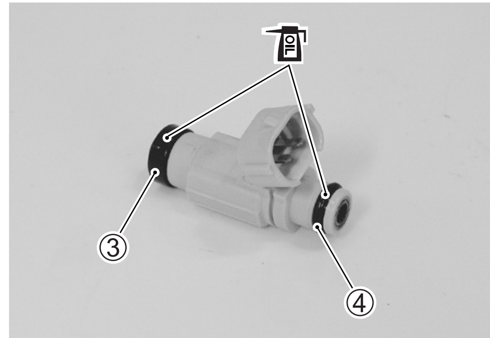


NOTE:
** Make sure the throttle valve open or close smoothly.*
** TP sensor setting procedure.* *(☞ Page 61)*

• Apply thin coat of the engine oil to the new cushion seal ③, and the O-ring ④.

CAUTION

Replace the cushion seal and O-ring with the new ones.

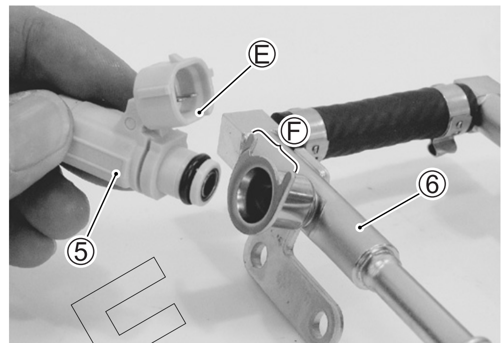


• Install the fuel injector ⑤ by pushing it straight to the delivery pipe ⑥.

NOTE:
Align the coupler Ⓔ of injector with boss Ⓕ of the delivery pipe.

CAUTION

Never turn the injector while pushing it.



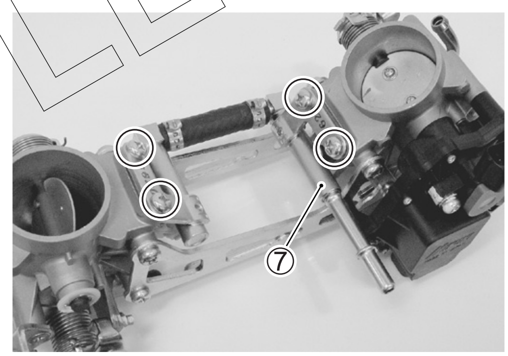
• Install the fuel delivery pipe/hose ⑦ to the throttle body assembly.

CAUTION

Never turn the fuel injectors while installing them.

• Tighten the fuel delivery pipe mounting screws to the specified torque.

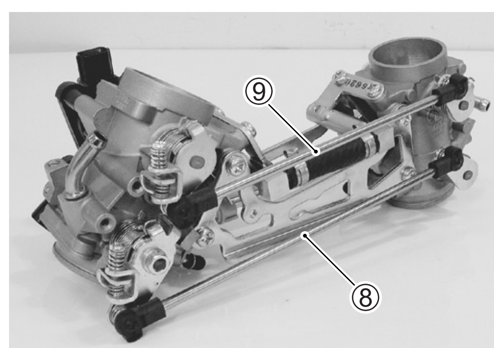
Fuel delivery pipe mounting screw:
5 N·m (0.5 kgf-m, 3.5 lb-ft)



SAMPLE

• Install the throttle link rod ⑧ and secondary throttle link rod ⑨.

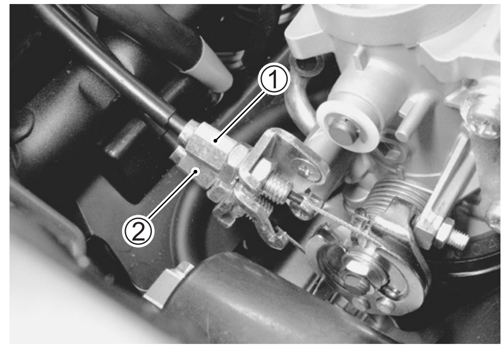
NOTE:
The throttle link rod ⑧ is longer than the secondary throttle link rod ⑨.



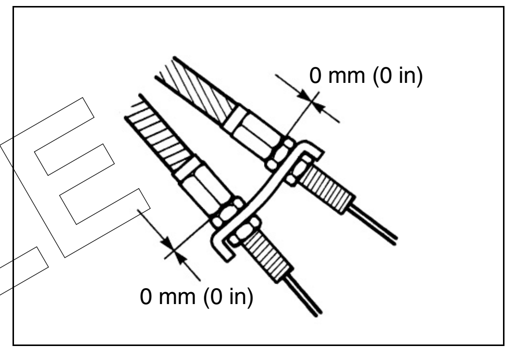
AIR CLEANER BOX AND THROTTLE BODY INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

- Connect the throttle pulling cable ① and throttle returning cable ② to the throttle cable drum.

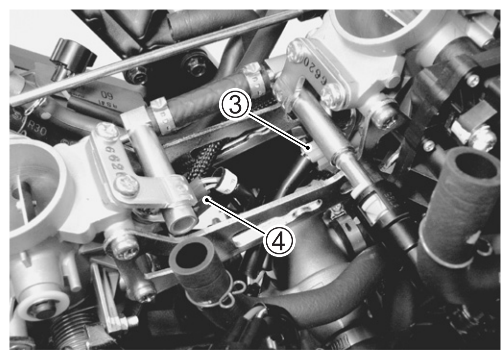


- Loosen each throttle cable lock-nut.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance is 0 mm (0 in).
- Tighten each lock-nut.
- Adjust the throttle cable play. (☞SV650/SK3 2-16)

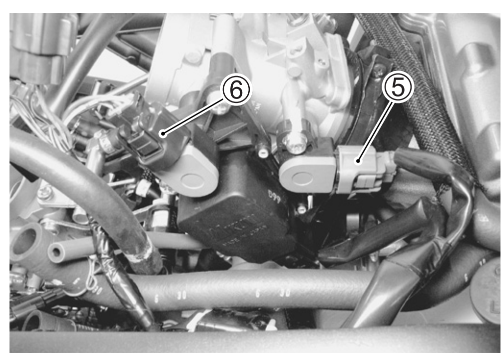


SAMPLE

- Connect the fuel injector couplers to the fuel injectors. Make sure that each coupler is installed in the correct position. The color on each lead wire coupler refers to the appropriate fuel injector.
  Front injector lead wire coupler ③: Brown
  Rear injector lead wire coupler ④: Gray



- Connect the TP sensor lead wire coupler ⑤ and STP sensor lead wire coupler ⑥.



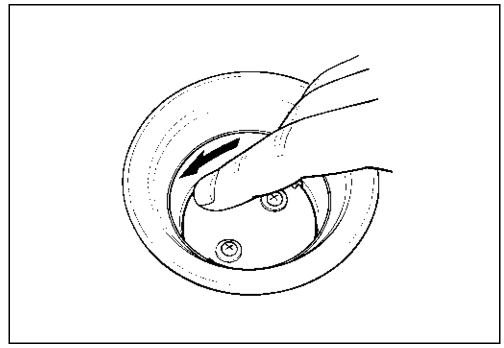
CAUTION

TP sensor lead wire coupler and STP sensor lead wire coupler resemble each other very closely in external appearance.
Make sure to check the color of coupler before installing.

TPS lead wire coupler ⑤: Gray
STPS lead wire coupler ⑥: Black

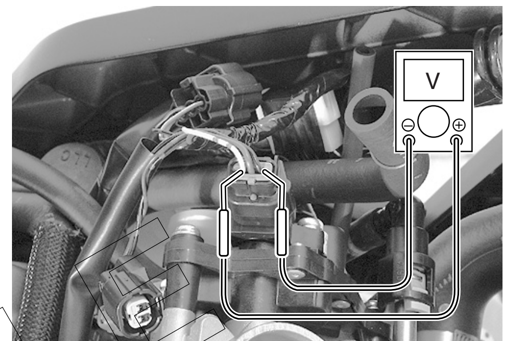
- Install the air cleaner box and tighten the throttle body clamp screws as shown in the illustration. (☞Page 145)

STP SENSOR ADJUSTMENT



If the STP sensor adjustment is necessary, measure the sensor out put voltage and adjust the STP sensor position as follows:

- Remove the air cleaner box. (☞Page 51)
- Disconnect the STVA coupler. (☞Page 28)
- Insert the needle pointed probes to the STP sensor lead wire coupler.
- Turn the ignition switch ON.
- Close the secondary throttle valve by finger, and measure the STP sensor out put voltage.



DATA **STP sensor output voltage**
ST valve is full closed: Approx. 0.6 V
(⊕ Yellow – ⊖ B/Br)

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



- If the STP sensor voltage is out of specification, loosen the STP sensor mounting screw and adjust the STP sensor voltage to specification.
- Tighten the STP sensor mounting screw.

TOOL **09930-11950: Torx wrench**

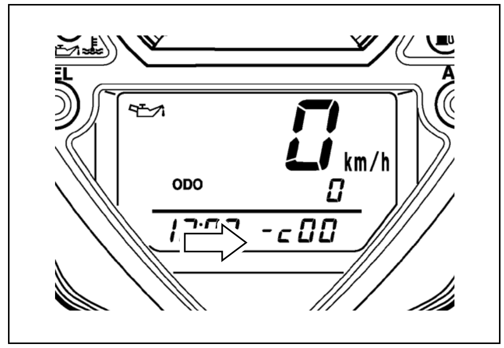
STP sensor mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)

SAMPLE

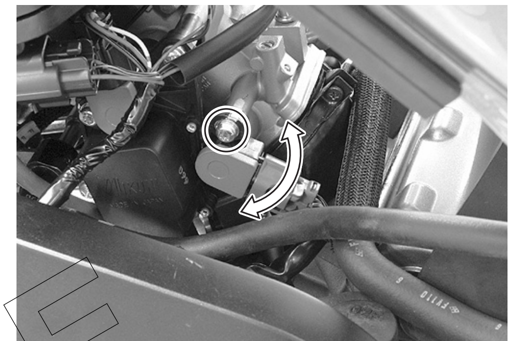
TP SENSOR ADJUSTMENT

After all adjustments are completed, check or adjust the TPS setting condition.

1. Warm up the engine and check the engine idle r/min.
2. Remove the right frame side cover. (☞SV650/SK3 7-4)
3. Connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness. (☞Page 65)



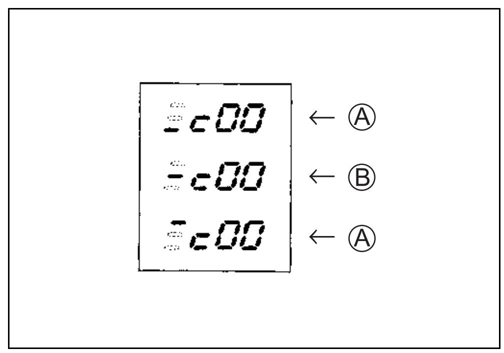
4. Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-7)
5. If the throttle position sensor adjustment is necessary, loosen the screw and turn the throttle position sensor and bring the line to the middle.
6. Then, tighten the screw to fix the throttle position sensor.



TOOL **09930-11950: Torx wrench**
09930-82720: Mode select switch

The LCD displays the line for 0.4 sec. at a time, and when such a display repeats two times, it indicates the current position where the sensor is fixed.

SAMPLE



Ⓐ Incorrect
Ⓑ Correct position

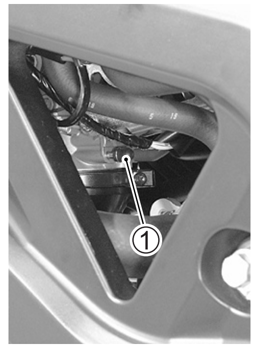
THROTTLE VALVE SYNCHRONIZATION

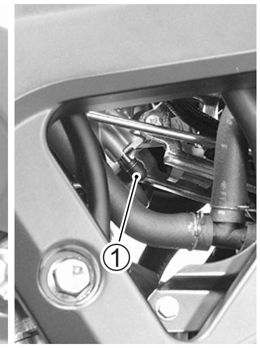
USE OF SDS TOOL

Check and adjust the throttle valve synchronization between two cylinders.

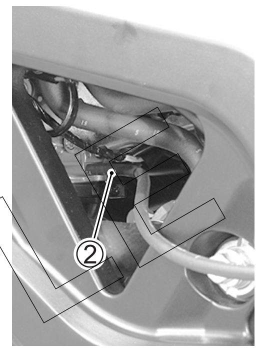
Step 1

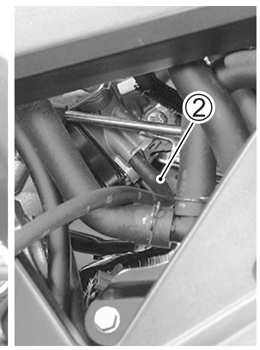
- Lift and support the fuel tank with its prop stay. (☞SV650/SK3 5-6)
- Remove the rubber caps ① from each vacuum nipple on the throttle body.





- Connect the vacuum tester hoses ② to each vacuum nipple.





SAMPLE

Step 2

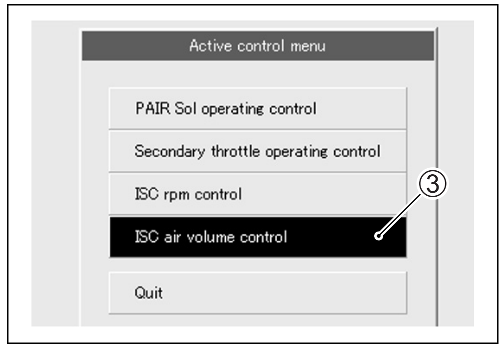
- Connect a tachometer.
- Set up the SDS tool. (☞Page 94)
- Click "Data monitor".
- Warm up the engine (Water temp. more than 80 °C (176 °F)).

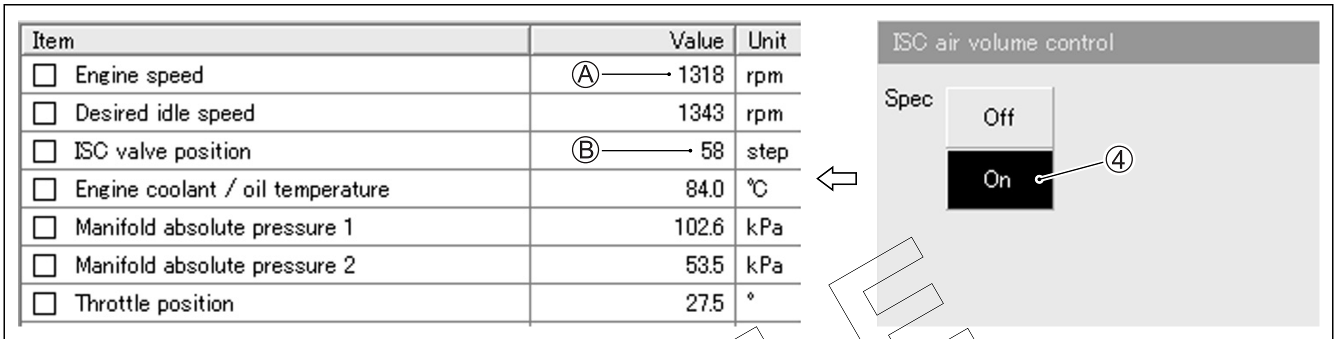
Item	Value	Unit
☐ Engine speed	1380	rpm
☐ Throttle position	27.9	°
☐ Manifold absolute pressure 1	65.9	kPa
☐ Engine coolant / oil temperature	88.0	℃
☐ Intake air temperature	39.0	℃
☐ Battery voltage	14.5	V
☐ O2 sensor	0.0	V

- Click "Active control".
- Click "ISC air volume control" ③.
- Click "ON" bottom ④ to fix the ISC air volume between two cylinders.

NOTE:
When making this synchronization, be sure that the water temperature is within 80 – 100 °C (176 – 212 °F).

Ⓐ Engine speed: Approx. 1 300 rpm
Ⓑ ISC valve position: Approx. 58 step





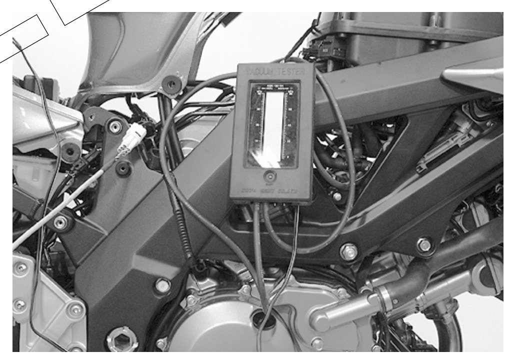
Item	Value	Unit
Engine speed	Ⓐ 1318	rpm
Desired idle speed	1343	rpm
ISC valve position	Ⓑ 58	step
Engine coolant / oil temperature	84.0	℃
Manifold absolute pressure 1	102.6	kPa
Manifold absolute pressure 2	53.5	kPa
Throttle position	27.5	°

SAMPLE

- Check for the synchronization of vacuum between #1 and #2 cylinders.
- Equalize the #1 and #2 vacuum by turning each air screw ⑤ and keep it running at idling speed.

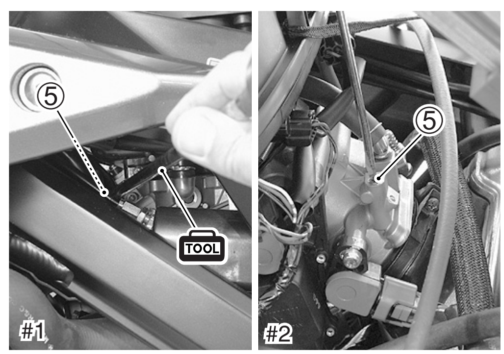
NOTE:
Always set the engine rpm at idle rpm.

TOOL 09913-10130: Carburetor adjuster driver



- If the adjustment is not yet correct, remove each air screw and clean them with a spray-type carburetor cleaner and blow dry with a compressed air.
- Also, clean the air screw passageways.

NOTE:
* *Slowly turn the air screw in clockwise and count the number of turns until the screw is lightly seated.*
* *Make a note of how many turns were made so the screw can be reset correctly after cleaning.*

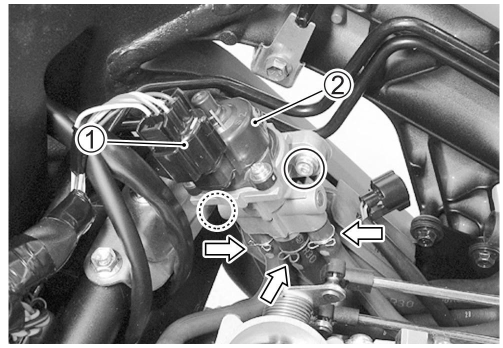


Step 3
Repeat the procedures of Step 2.

ISC VALVE

REMOVAL

- Remove the air cleaner box. (☞Page 51)
- Disconnect the ISC valve coupler ①.



CAUTION

Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF. If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.

- Disconnect the hoses and remove the ISC valve ②.

INSTALLATION

Install the ISC valve in the reverse order of removal.

NOTE:
When the ISC valve is removed or replaced, the ISC valve or new one should be set to the PRE-SET position. (☞Page 65)

SAMPLE

INSPECTION

The ISC valve can be checked without removing it.
(☞Page 41)

If the resistance is not within the standard range, replace the ISC valve motor assembly with a new one.



Visual inspection

- Remove the screws.
- Check the ISC valve for wear, damage or carbon deposited. If any defects are found, replace it with a new one.

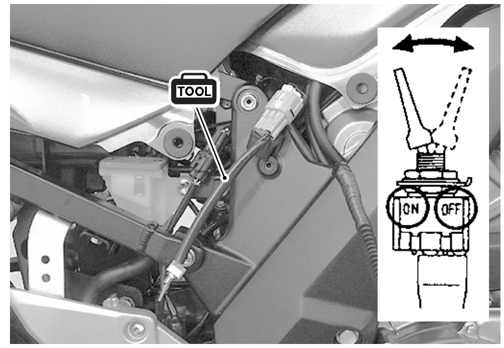


CAUTION

Normally, the removed O-ring must be replaced with a new one. However, this O-ring is not available for the spare parts. If it is found to be damaged, replace the ISC valve with new one.

ISC VALVE PRE-SET

When removing or replace the ISC valve, set the ISC valve to the following procedures:



PROCEDURE

1) Turn the ignition switch OFF position.
2) Remove the seat. (☞SV650/SK3 7-4)
3) Connect the special tool to the dealer mode coupler and turn its switch to ON position.

TOOL 09930-82720: Mode select switch

4) Turn the ignition switch to ON position.
5) Turn the ignition switch to OFF position.
6) Then, wait more than 5 seconds.

NOTE:
The ISC valve automatically is set at PRE-SET position.

7) Turn the special tool to OFF position and remove it from the dealer mode coupler.

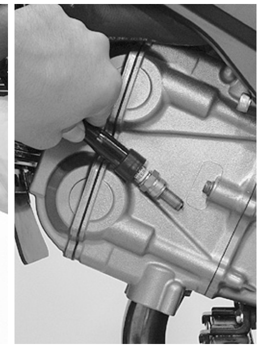
SAMPLE

IGNITION SYSTEM

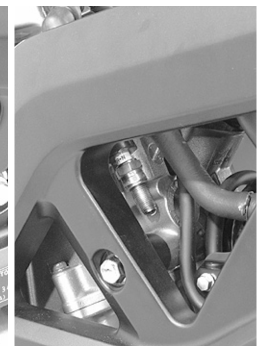
INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE



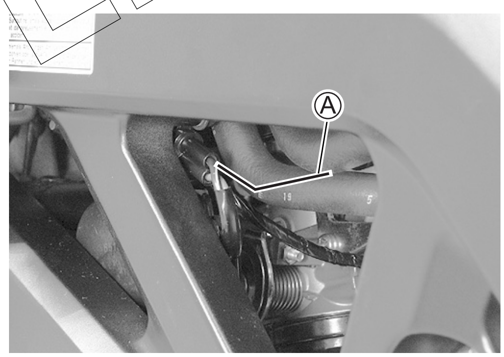






- Disconnect all the spark plug caps. (☞Page 13)
- Connect new spark plugs to each spark plug cap and ground them on the cylinder.

NOTE:
Be sure that all the spark plugs are connected properly and the battery used is in fully-charged condition.



Measure ignition coil primary peak voltage (for #1 cylinder) in the following procedure.

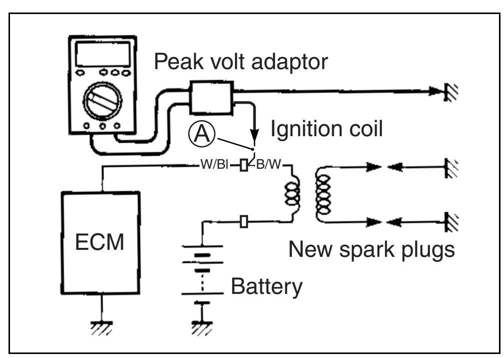
- Insert the needle pointed probe Ⓐ to the lead wire coupler (for B/W wire).

SAMPLE

CAUTION

Use the special tool, to prevent the rubber of the water proof coupler from damage.

TOOL **09900-25009: Needle pointed probe set**



- Connect the multi-circuit tester with the peak voltage adaptor as follows.

Ignition coil (for #1cylinder):
B/W wire (⊕ Probe) – Ground (⊖ Probe)

NOTE:
Do not disconnect the ignition coil primary lead wire.

TOOL **09900-25008: Multi-circuit tester set**

CAUTION

Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

- Shift the transmission into neutral, turn the ignition switch to the "ON" position and grasp the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.

DATA **Ignition coil primary peak voltage: 150 V and more**

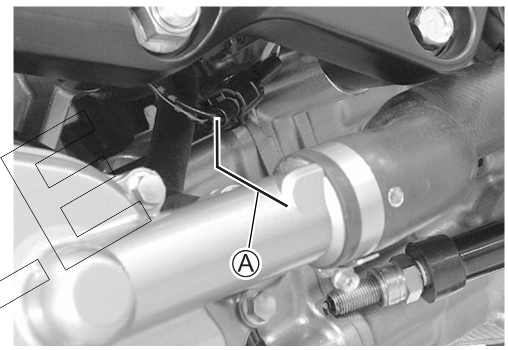
Tester knob indication: Voltage (⎓)

⚠ WARNING

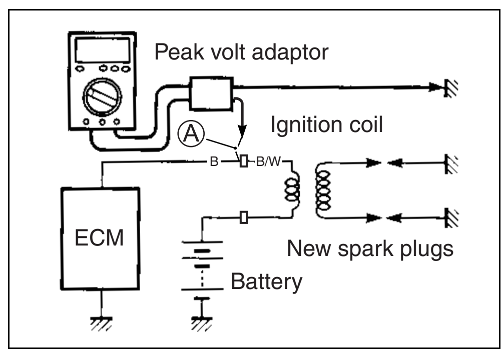
Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

Measure ignition coil primary peak voltage (for #2 cylinder) in the same manner as for cylinder #1.
Ignition coil (for #2 cylinder):
B wire (⊕ Probe) – Ground (⊖ Probe)

NOTE:
Do not disconnect the ignition coil primary lead wire.



Ⓐ Needle pointed probe



DATA **Ignition coil primary peak voltage: 150 V and more**

Tester knob indication: Voltage (⎓)

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

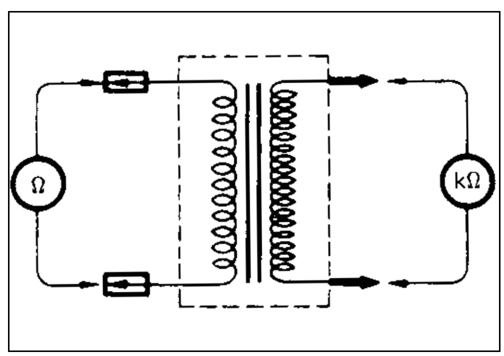
If the voltages are lower than the standard values, inspect the ignition coil. (☞below)

SAMPLE

IGNITION COIL RESISTANCE

- Measure the ignition coil resistance in both the primary and secondary windings. If the windings are in sound condition, their resistance should be close to the specified values.

DATA **Ignition coil resistance**
Primary: 1 – 5 Ω (Terminal – Terminal)
Secondary: 25 – 40 kΩ
(Spark plug cap – Spark plug cap)

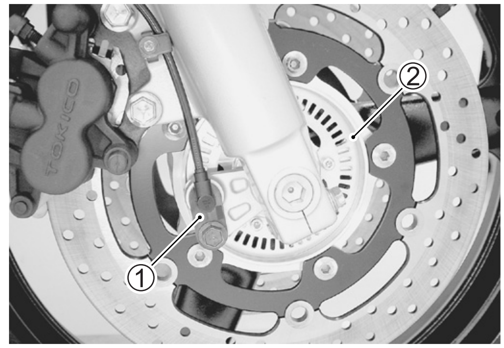


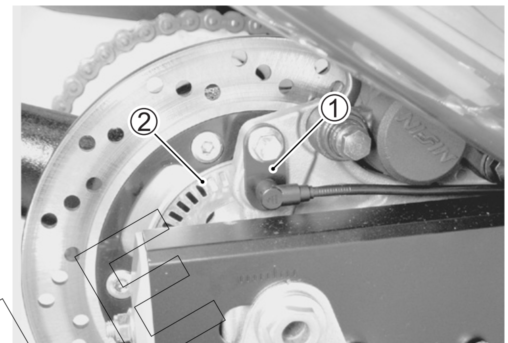
Tester knob indication: Resistance (Ω)

INTRODUCTION OF ABS (For SV650A/SA)

FRONT AND REAR WHEEL SPEED SENSORS

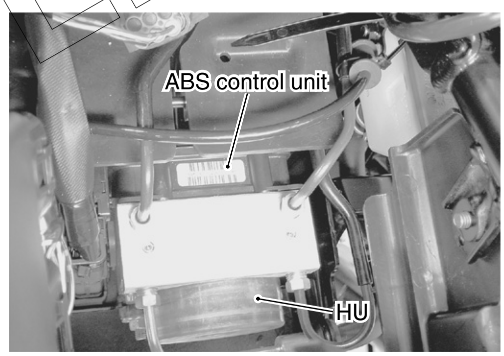
Wheel speed sensor consists of wheel speed sensor ① and sensor rotor ②.





ABS CONTROL UNIT

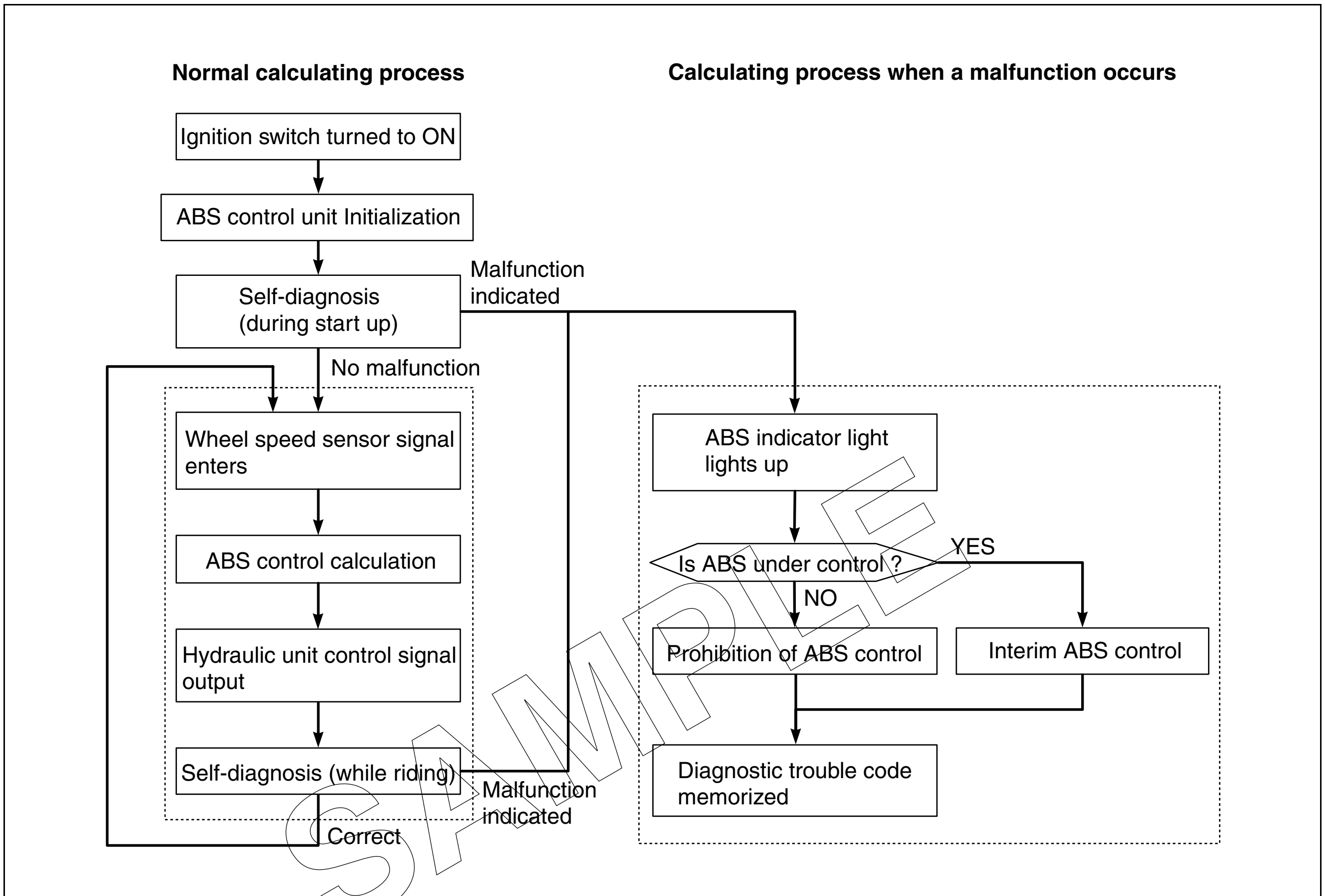
The ABS control unit is located under the battery.
ABS control unit calculates signals input from each one of front and rear wheel speed sensors, monitors the slipping conditions of the wheels and, at the same time, sends control signal to Hydraulic Unit (HU).
This ABS control unit/HU can not be disassembled.



SAMPLE

ABS CONTROL UNIT CALCULATING PROCESS

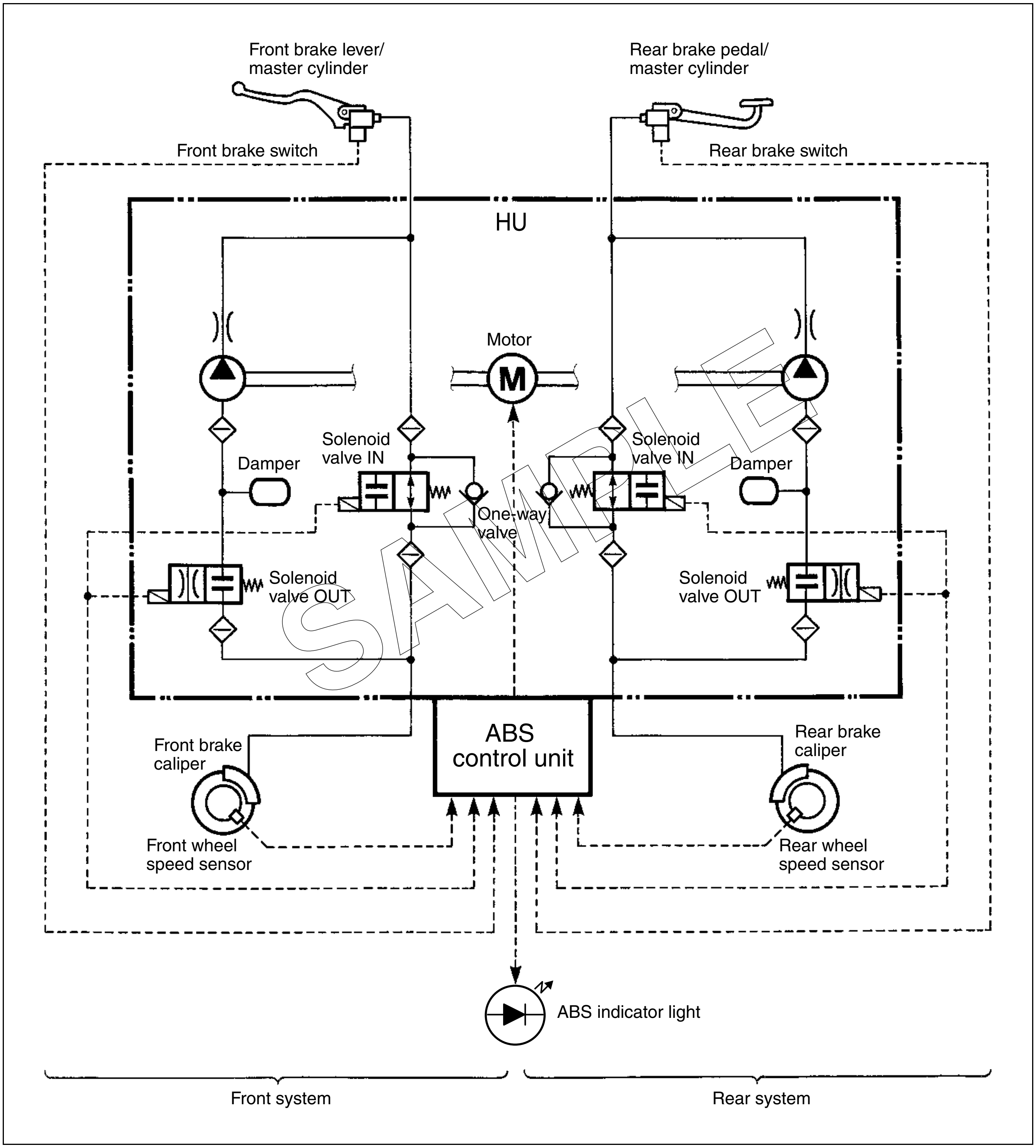
The ABS controls and its calculations, in addition to the self-diagnosing and the fail-safe processes, occur during the ABS control unit calculating process. In addition, if a malfunction is detected by the self-diagnosis function, the brake stops being controlled by the ABS and a diagnostic trouble code is stored.



SAMPLE

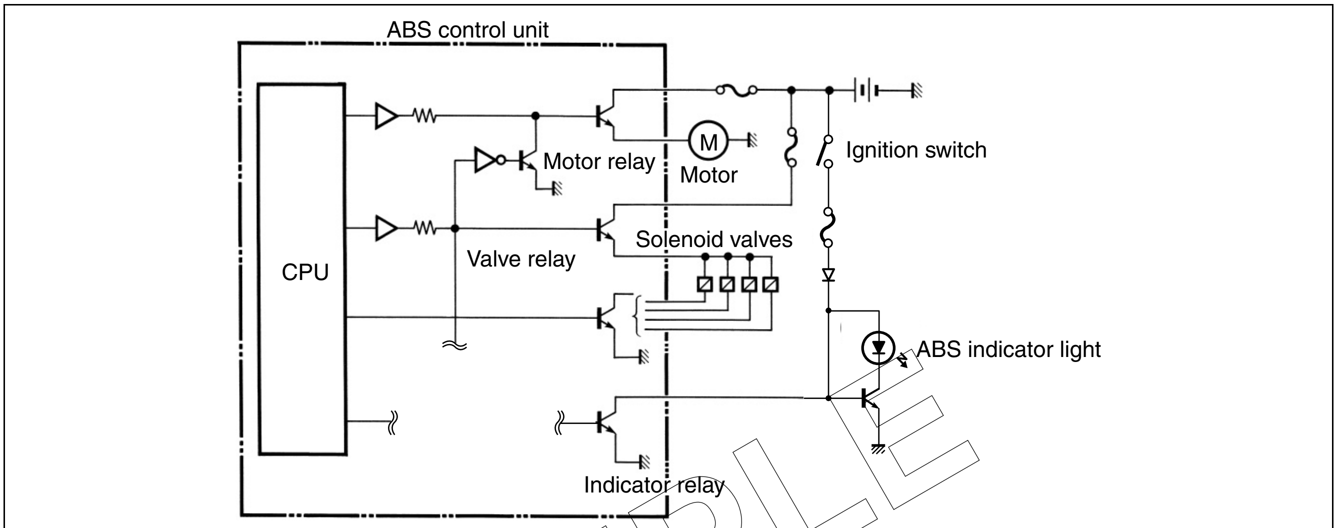
HYDRAULIC UNIT (HU)

The hydraulic unit operates the solenoid valves based upon the signal which is output from the ABS control unit. The brake fluid pressure is then adjusted accordingly. The hydraulic unit controls the front and rear brake systems individually by operating separate components for the front and the rear, except for the pump drive motor, which is shared by both systems.



FAIL-SAFE FUNCTION

If malfunction occurs in the ABS electric system, this sets valve relay OFF. Consequently, motor relay will be set OFF and the indicator light ON, and no current will be applied to motor solenoid valve inactivating ABS and turning ABS indicator light ON. In this case, it functions as the normal brake. However, if malfunctions occurs while ABS is being activated, when ABS control unit diagnoses that the operation can continue, it will effectuate ABS provisional control (turning the ABS indicator light ON). Upon the moment when ABS provisional control is over, the valve relay will be set OFF.

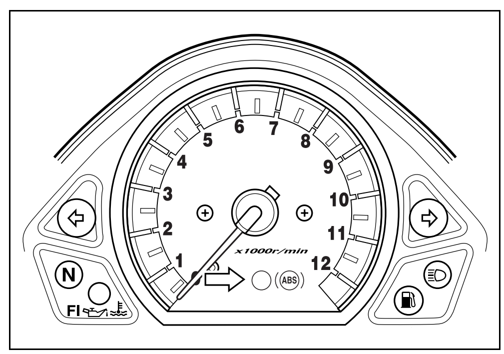


SELF-DIAGNOSIS FUNCTION AND ABS INDICATOR LIGHT

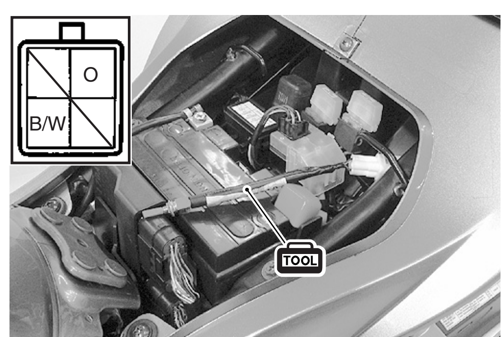
The ABS control unit performs the self-diagnosis and can store any electronically detected malfunctions as diagnostic trouble codes. If a malfunction has occurred, the indicator light lights up to inform the rider of the malfunction. The special tool, when connected to the mode select coupler, enables the ABS indicator light to display the diagnostic trouble codes.

ABS INDICATOR LIGHT

The ABS indicator light informs the rider of any ABS malfunctions. If a malfunction occurred, the ABS indicator light flashes, during the self-diagnosis, to indicate the diagnostic trouble code so that the correct part can be repaired.



- When the ignition switch is turned to ON, the ABS indicator light lights up even if no malfunction has occurred, to indicate that the bulb is not burnt out. It will go off after the motorcycle is ridden at more than 5 km/h (3.1 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.
- When a malfunction has occurred in the ABS, connect the special tool to the mode select coupler to display the diagnostic trouble code on the ABS indicator light. (☞Page 89)



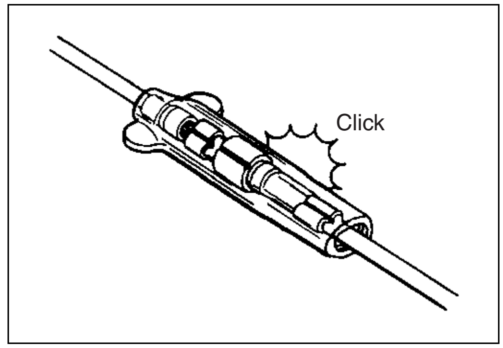
TOOL **09930-82710: Mode select switch**

SAMPLE

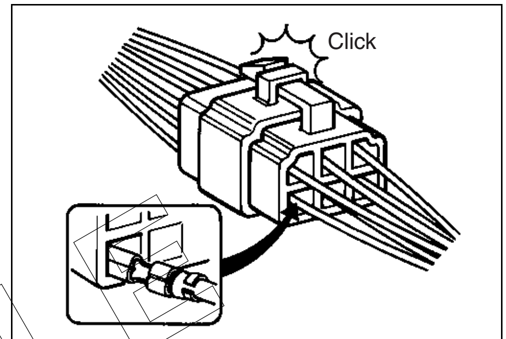
CAUTIONS IN SERVICING

ABS WIRING

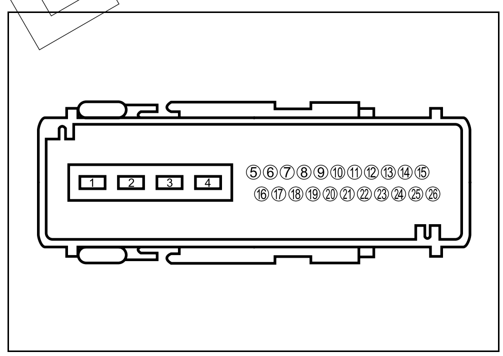
- The ABS parts are connected to various lead wires. The coupler and lead wire connections, as well as the lead wire and wire harness routing must be done correctly. Make sure that the proper clamps are used and positioned correctly.



NOTE:
If all of the connections are not properly connected, the ABS may not operate correctly. For connector and coupler precautions. (☞SV650/SK3 4-2 and 8-2)



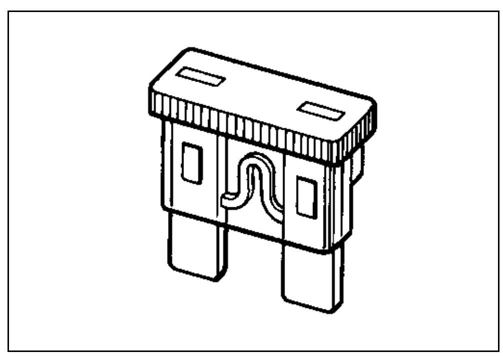
- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.



SAMPLE

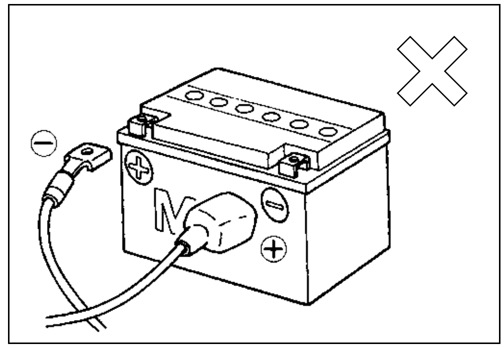
FUSES

- If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.
- Only use a fuse of the specified rating.
- Never improvise when replacing a fuse.



BATTERY

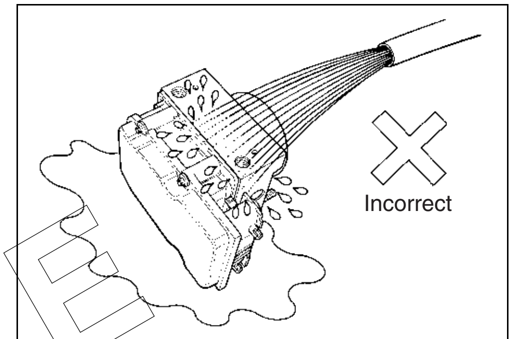
- Only use a fully charged battery.
- In order to prevent damage to the ABS control unit etc., be sure to connect the battery properly.
- Never disconnect the battery or any other lead wires while the engine is running.



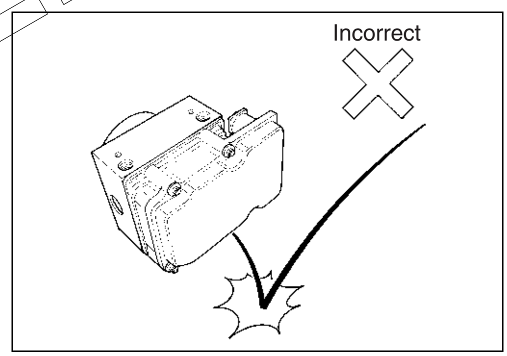
NOTE:
For battery and battery connection precautions.
(☞SV650/SK3 4-4 and 8-3)

ABS CONTROL UNIT/HU

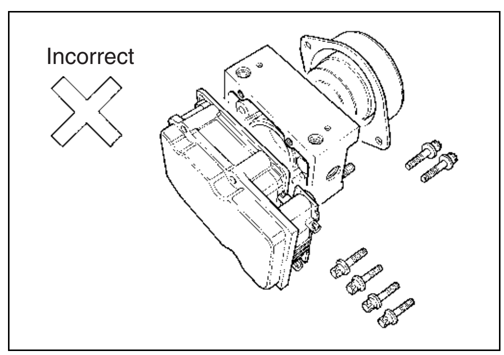
- Never allow dust or water to contact the ABS control unit/HU.



- Never subject the ABS control unit/HU to strong impacts or allow them to be dropped.



- The ABS control unit/HU cannot be disassembled. Replace the whole unit with a new one.



SAMPLE

ABS INFORMATION

⚠ WARNING

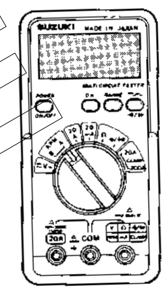
* **Be sure to bleed air from the brake fluid circuit when the brake feel is spongy or when a brake relating part is replaced.**
* **Never ride the motorcycle before bleeding the air.**

- Be sure to route the brake hoses correctly.
- The ABS does not shorten the motorcycle's braking distance. When riding down slopes or on wet or bumpy roads the braking distance is lengthened as compared to a motorcycle without ABS. In addition, braking distance increases the more slippery the road is.
- The ABS does not control slides which may occur when braking while turning. As with a motorcycle that does not have ABS, it is best not apply the brakes while turning.
- The brake levers may move by themselves when they are applied. This is not a malfunction.
- Only use the specified tires.

TESTER

- Use the Suzuki multi-circuit tester (09900-25008).
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.
- Since the resistance may differ depending on the tester used and the temperature, the resistance should be set to the specification.

MULTI-CIRCUIT TESTER



SAMPLE

USING THE TESTER

- Incorrectly connecting the ⊕ and ⊖ probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi-circuit tester, ∞ will be shown as 10.00 MΩ and "1" flashes in the display.
- Check that no voltage is applied before making the measurement. If voltage is applied the tester may be damaged.
- After using the tester, turn the power off.

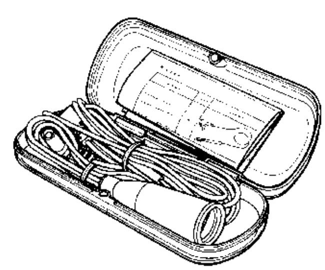
TOOL **09900-25008: Multi-circuit tester set**

NOTE:

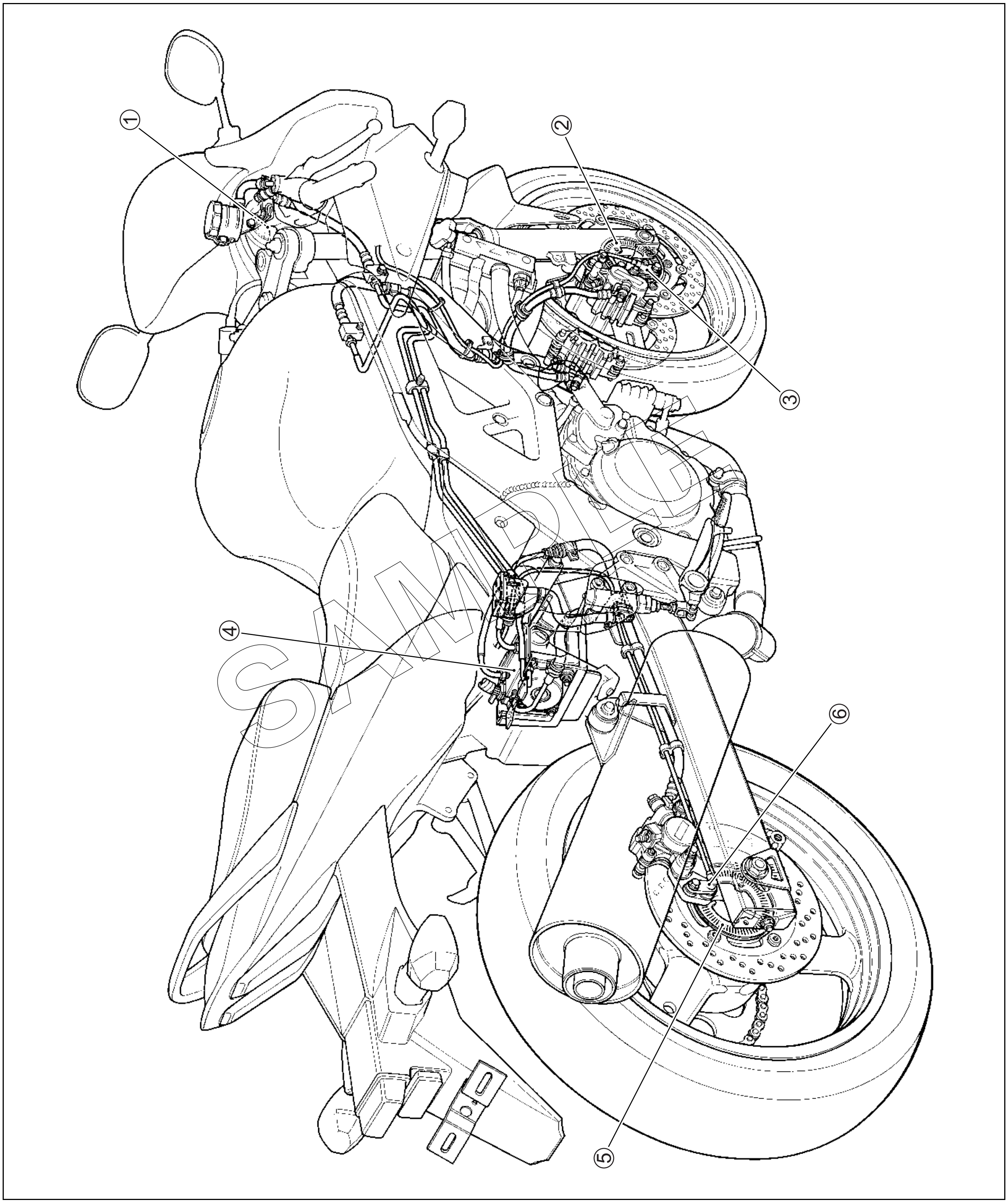
* *When connecting the multi-circuit tester, use a needle pointed probe set to the back side of the lead wire coupler and connect the probes of tester to them.*
* *Use a needle pointed probe set to prevent the rubber of the water proof coupler from damage.*

TOOL **09900-25009: Needle pointed probe set**

NEEDLE POINTED PROBE SET

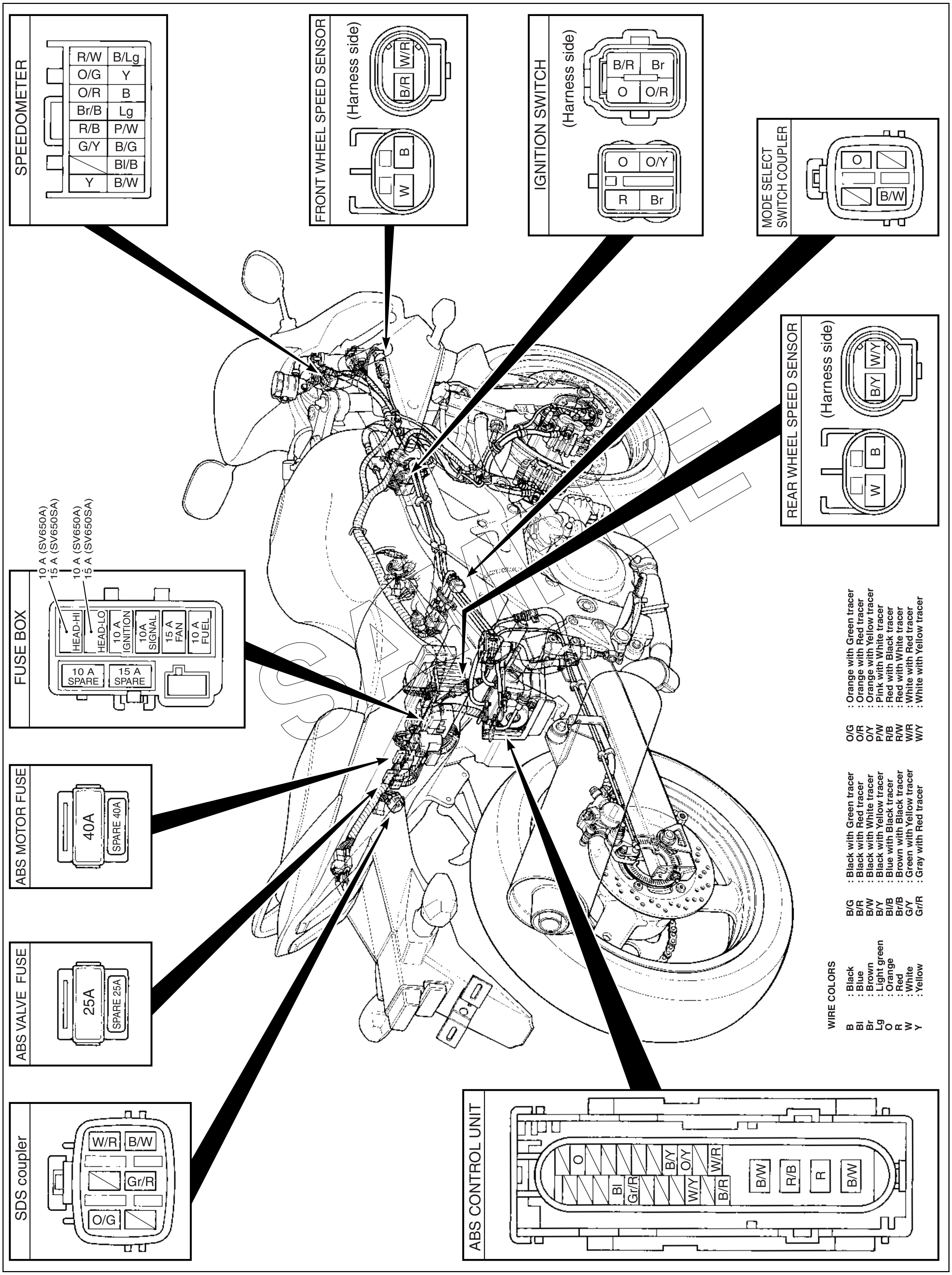


ABS COMPONENTS
ABS COMPONENTS LOCATION

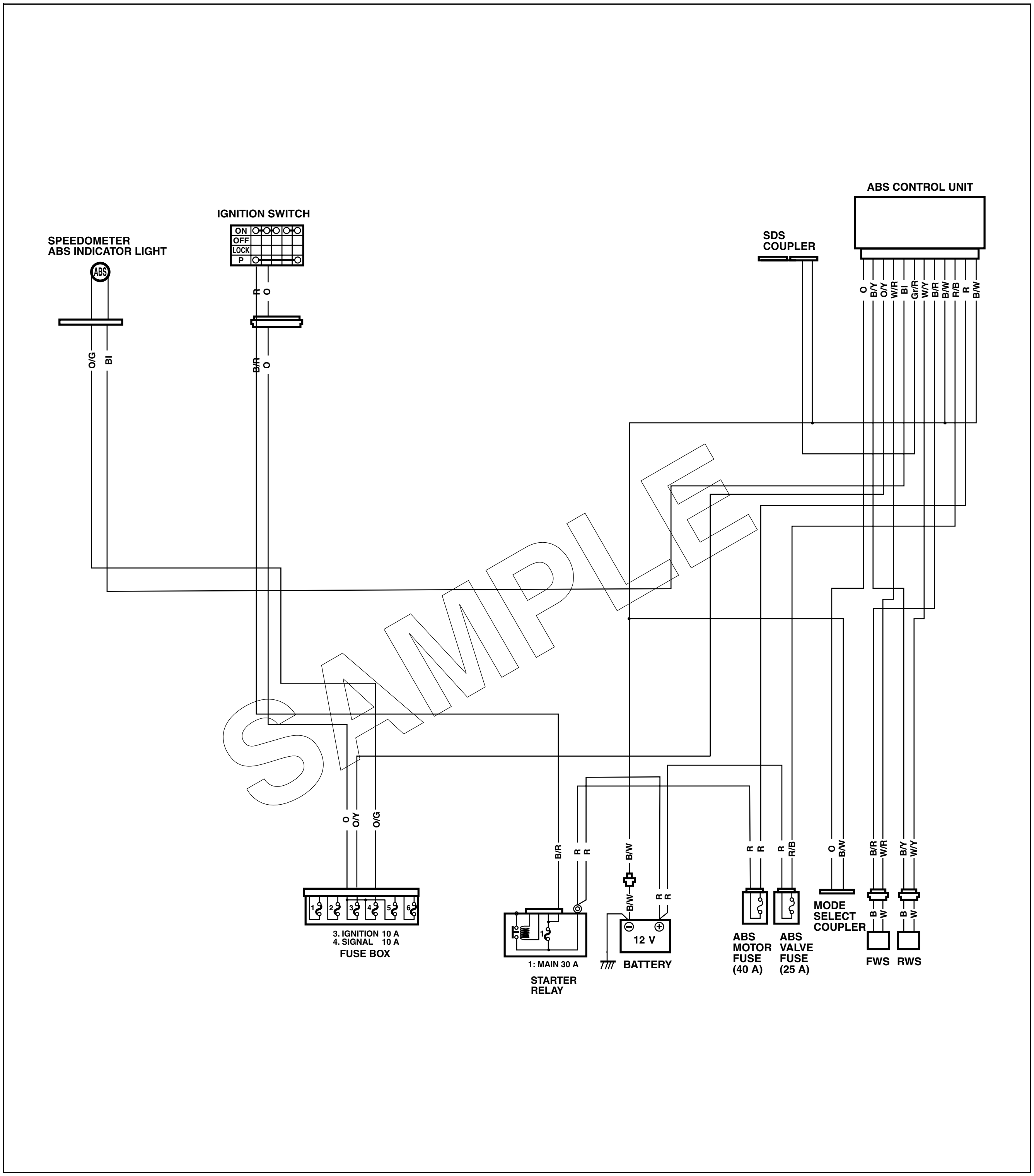


① ABS indicator light
② Front wheel speed sensor rotor
③ Front wheel speed sensor
④ ABS control unit/HU
⑤ Rear wheel speed sensor rotor
⑥ Rear wheel speed sensor

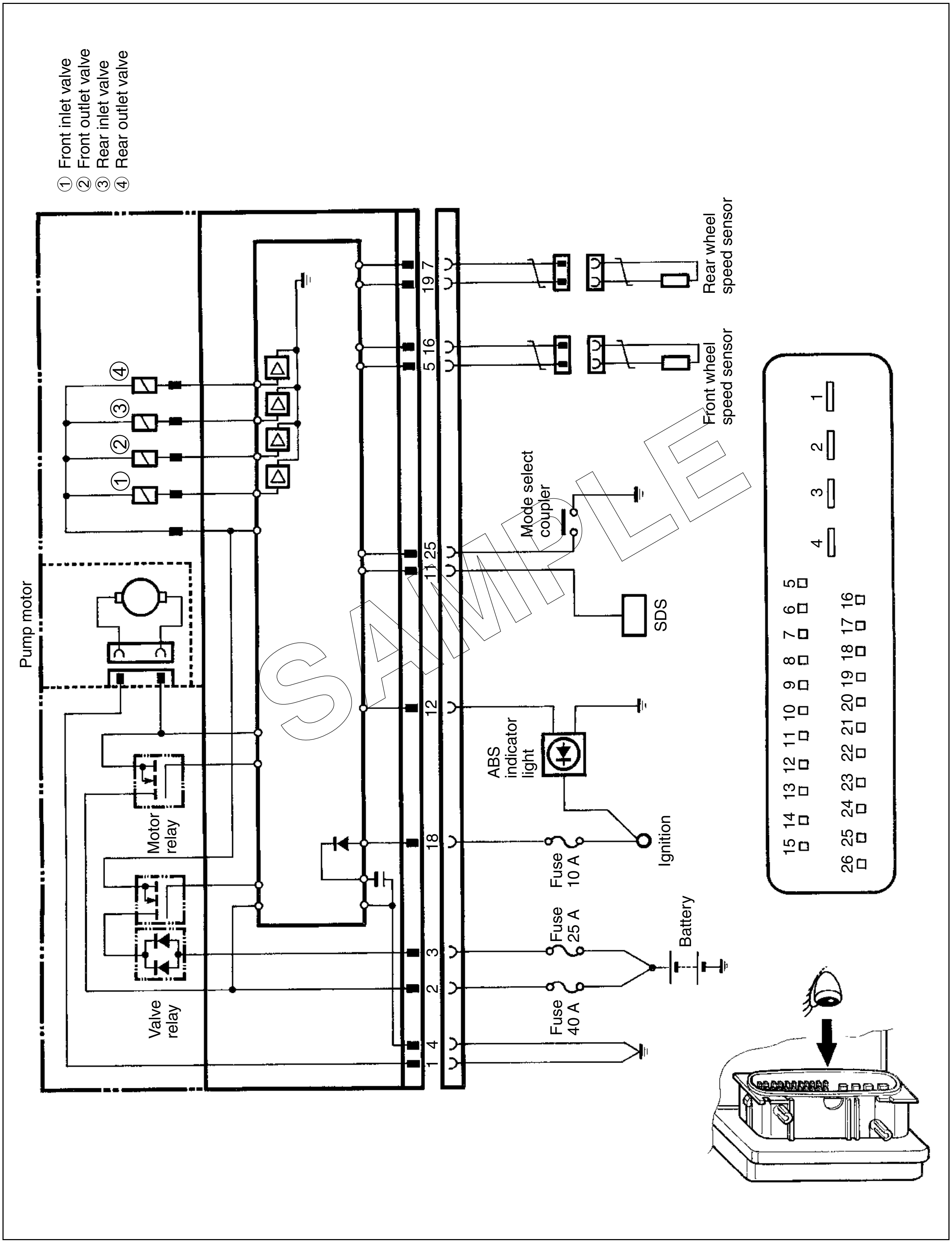
ABS COUPLER CONNECTION DIAGRAM



ABS WIRING DIAGRAM



ABS UNIT SYSTEM DIAGRAM



SAMPLE

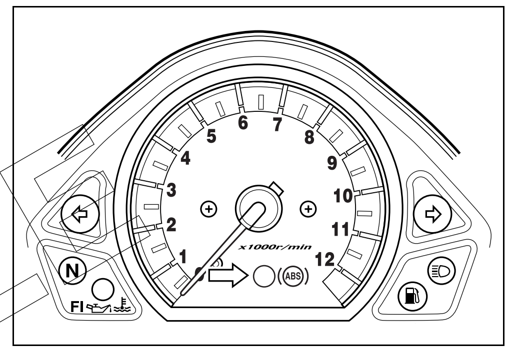
ABS TROUBLESHOOTING

ABS TROUBLESHOOTING DESCRIPTION

Many of the ABS malfunction diagnosing operations are performed by checking the wiring continuity. Quick and accurate detection of malfunctions within the complex circuitry assures the proper operation of the ABS. Before beginning any repairs, thoroughly read and understand this Supplementary Service Manual.
The ABS is equipped with a self-diagnosis function. The detected malfunction is stored as a diagnostic trouble code which causes the ABS indicator light to light up or flash in set patterns to indicate the malfunction. Diagnostic trouble codes are stored even when the ignition switch is turned to OFF and they can only be erased manually. In order to repair the ABS correctly, ask the customer for the exact circumstances under which the malfunction occurred, then check the ABS indicator light and the output diagnostic trouble codes. Explain to the customer that depending on how the motorcycle is operated (e.g., if the front wheel is off the ground), the ABS indicator light may light up even though the ABS is operating correctly.

ABS OPERATION AND ABS INDICATOR LIGHT

The ABS indicator light shows the ABS operating condition. During normal operation, the ABS indicator light lights up when the ignition switch is turned to ON and goes off after the motorcycle is ridden at more than 5 km/h (3.1 mile/h). If a malfunction has occurred, the ABS indicator light keeps lighting up.



SAMPLE

The ABS indicator light goes off when the motorcycle is ridden at more than 5 km/h (3.1 mile/h).	The ABS is normally activated.
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 5 km/h (3.1 mile/h).	One or more malfunction has been found and ABS activation been hanged up.
The ABS indicator light does not light up when turning the ignition switch to ON.	Check the wire harness and combination meter. (☞Page 86)

STORED DTCs (Diagnostic Trouble Codes)

The maximum of six DTCs can be recorded. In these records, duplication of the same DTC will not occur. If the system detects the 7th DTC, it overwrites the record of the oldest DTC.
Check and see if any diagnostic trouble code remains, by actually running the machine to activate ABS and by carrying out the self-diagnosis after deleting the diagnostic trouble code once the malfunctioned part is repaired.

TROUBLESHOOTING PROCEDURE

Troubleshooting should be proceed as follows. If the order is performed incorrectly or any part is omitted, a misdiagnosis may result.

1. Gather information from the customer. (☞Page 82)
2. Perform the pre-diagnosis inspection. (☞Page 83)
3. Inspect the ABS indicator light. (☞Page 86)
4. Output the DTCs stored in the ABS control unit. (☞Page 89)
5. Perform appropriate troubleshooting procedures according to the DTCs output. (☞Page 90)
   If troubleshooting procedures cannot be performed, try to determine the cause of the malfunction according to the information gathered in 1 through 4 and inspect the wiring. (☞Page 77 and 78)

CAUTION

* **When disconnecting couplers and turning the ignition switch to ON, disconnect the ABS control unit coupler in order to prevent a DTC from being stored.**
* **Each time a resistance is measured, the ignition switch should be set to OFF.**

6. Inspect the ABS components. (☞Page 119)
7. Delete the DTCs and check the brake operation. (☞Page 91)

SAMPLE

BASIC TROUBLESHOOTING DIAGRAM

1. Gather information from the customer. (☞Page 82)

↓

2. Perform the pre-diagnosis inspection. (☞Page 83)

↓

3. Inspect the ABS indicator light. (☞Page 86)

↓

4. Output the DTCs stored in the ABS control unit. (☞Page 89)

↓

5. Perform appropriate troubleshooting procedures according to the DTCs output. (☞Page 90)
   If troubleshooting procedures cannot be performed, try to determine the cause of the malfunction according to the information gathered in 1 through 4 and inspect the wiring. (☞Page 77 and 78)

↓

6. Inspect the ABS components. (☞Page 119)

↓

7. Delete the DTCs and check the brake operation. (☞Page 91)

SAMPLE

INFORMATION GATHERING

To properly diagnose a malfunction, one must not make guesses or assumptions about the circumstances that caused it. Proper diagnosis and repair require duplicating the situation in which the malfunction occurred. If a diagnosis is made without duplicating the malfunction, even an experienced service technician may make a misdiagnosis and not perform the servicing procedure correctly, resulting in the malfunction not being repaired. For example, a malfunction that occurs only while braking on slippery surfaces will not occur if the motorcycle is ridden on a non-slippery surface. Therefore, in order to properly diagnose and repair the motorcycle, the customer must be questioned about the conditions at the time that the malfunction occurred making "Information gathering" very important. In order for the information obtained from the customer to be used as a reference during troubleshooting, it is necessary to ask certain important questions concerning the malfunction. Therefore, a questionnaire has been created to improve the information-gathering procedure.

Questionnaire Example

Customer's name	License plate No.	Frame serial No.	Mileage
First registered year	Date malfunction occurred	Frequency of occurrence	Weather of date of occurrence

PROBLEM SYMPTOMS	
ABS operation ☐ ABS does not work ☐ ABS works so often ☐ Too long stopping distance ☐ Others	**Past malfunctions and repairs**

CONDITIONS WHEN MALFUNCTION OCCURED	
ABS indicator light ☐ Does not light up ☐ Lights up Goes off after running over 5 km/h ☐ Yes ☐ No ☐ Flashes	**Riding conditions** ☐ While stopping ☐ Over 10 km/h ☐ When turning ☐ Others
Tires ☐ Abnormal air pressure ☐ Less thread depth ☐ No specified tires installed	**Brake operating conditions** ☐ Usual braking ☐ Quick/hard braking
Road surface Paved road ☐ Dry ☐ Wet ☐ Others Unpaved road ☐ Gravel ☐ Muddy ☐ Uneven ☐ Others	**Interface** ☐ Too big pulsations at brake levers ☐ Too large brake lever strokes ☐ Others **Others** ☐ Abnormal noise from the ABS control unit/HU ☐ Skid noise from the calipers ☐ Vibration at the brake levers
Note:	

SAMPLE

NOTE:
The above form is a standard sample. It should be modified according to characteristic of each market.

PRE-DIAGNOSIS INSPECTION

The mechanical and hydraulic components of the brake system should be inspected prior to performing any electrical checks. These inspections may find problems that the ABS could not detect; thus, shortening repair time.

BRAKE

Brake fluid level check (☞SV650/SK3 2-25)
Brake pad inspection (☞SV650/SK3 2-26)
Brake fluid circuit air bleeding (☞SV650/SK3 2-27)

TIRE AND WHEEL

Tire type :
Front : DUNLOP D220FST (SV650A)
: DUNLOP D220FST M (SV650SA)
Rear : DUNLOP D220ST L

CAUTION

* **The standard tire fitted on this motorcycle is 120/60ZR17M/C 55W for front and 160/60ZR17M/C 69W for rear. The use of tires other than those specified may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.**
* **Replace the tire as a set, otherwise the DTC "25" (C1625) may be stored.**

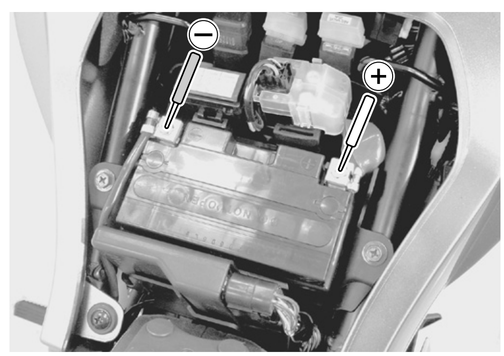
SAMPLE

Tire pressure (☞SV650/SK3 2-29)
Wheel (☞SV650/SK3 7-10 and -89)

BATTERY

Battery voltage

- Turn the ignition switch to OFF.
- Remove the front seat. (☞SV650/SK3 7-4)
- Measure the voltage between the ⊕ and ⊖ battery terminals using the multi-circuit tester.



DATA **Battery voltage: 12.0 V and more**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

If the voltage is less than 12.0 V, charge or replace the battery and inspect the charging system. (☞SV650/SK3 8-7)

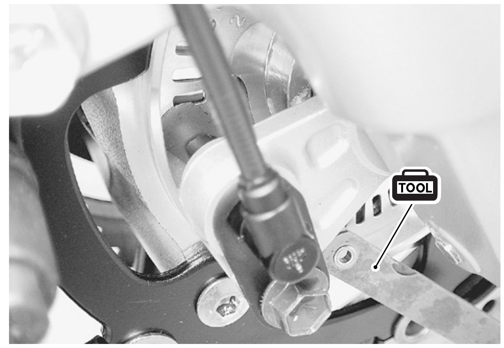
ABS COMPONENT

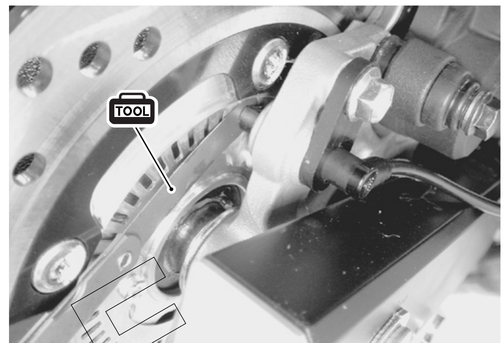
Wheel speed sensor – sensor rotor clearance

- Inspect the clearance between the wheel speed sensor and sensor rotor for each wheel using the thickness gauge.

DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge

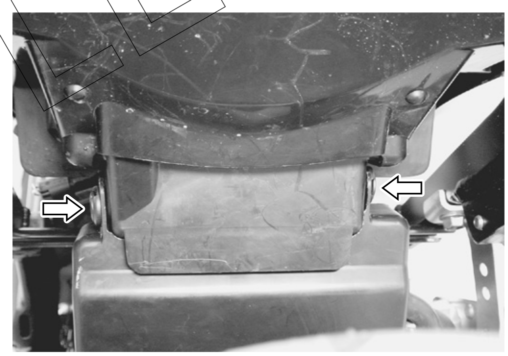


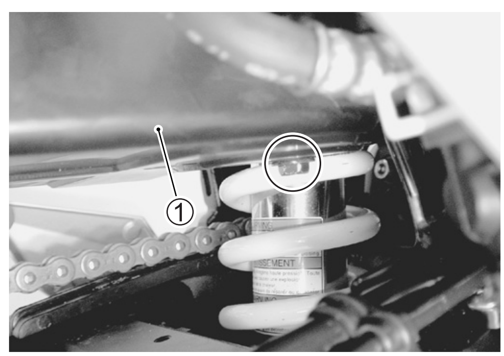


ABS control unit/HU ground wire inspection

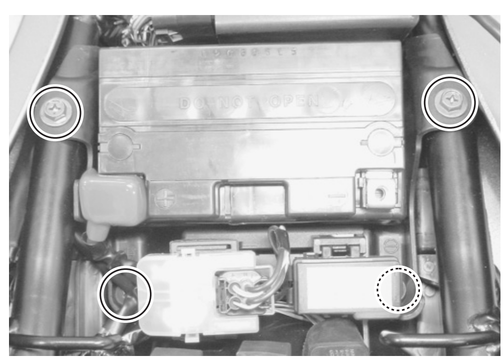
- Turn the ignition switch to OFF.
- Remove the front seat. (☞SV650/SK3 7-4)
- Disconnect the battery ⊖ lead wire.
- Remove the ABS control unit/HU cover ①.

SAMPLE

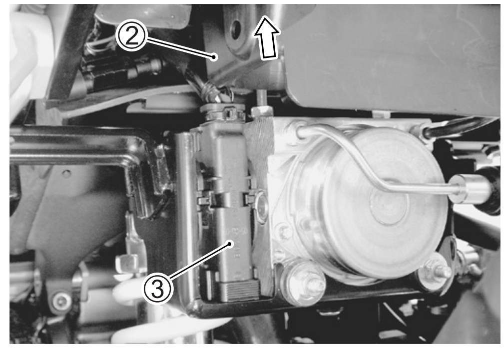


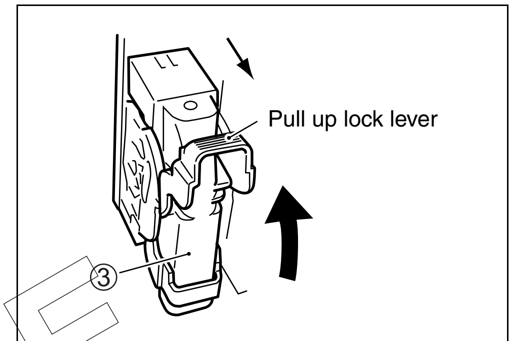


- Remove the battery case bolts.

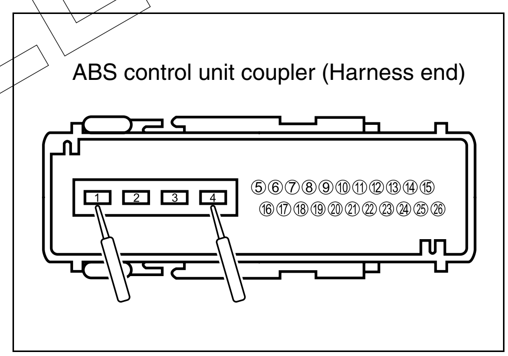


- Lift up the battery case ② and disconnect the ABS control unit coupler ③.





- Check for continuity between ① terminal of coupler and battery ⊖ terminal, also ④ terminal of coupler and battery ⊖ terminal.



TOOL 09900-25008: Multi-circuit tester set

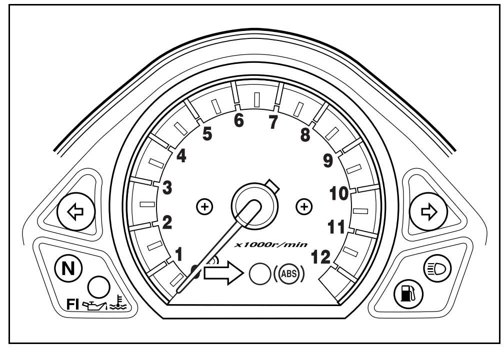
Tester knob indication: Continuity (•)))

If there are no continuity, repair the coupler or wire harness.



SAMPLE

ABS INDICATOR LIGHT INSPECTION



Step 1

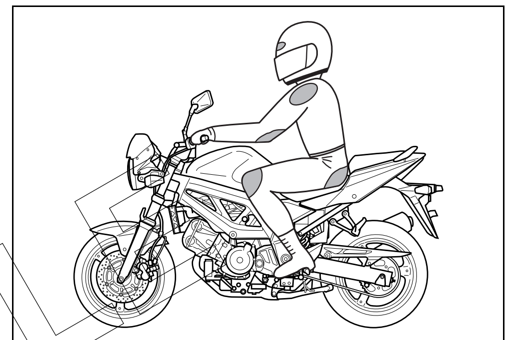
1) Check if the ABS indicator light lights up when turning the ignition switch to ON.

NOTE:
If the ABS indicator light flashes, there may be a short-circuit existing in the mode select switch wire.

Does the ABS indicator light up?

YES	Go to step 2.
NO	Go to step 3.

The ABS indicator light lights up
Step 2



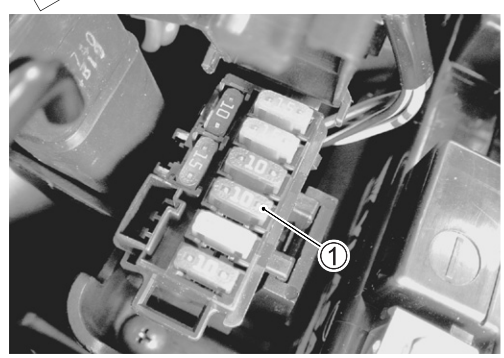
1) Ride the motorcycle at more than 5 km/h (3.1 mile/h).

Does the ABS indicator light go off?

YES	Normal (No DTC exists)
NO	DTC OUTPUT (☞Page 89) If DTC can not be output (the ABS indicator light does not flash), go to step 6.

SAMPLE

The ABS indicator light does not light up
Step 3



1) Turn the ignition switch to OFF.
2) Remove the front seat. (☞SV650/SK3 7-4)
3) Open the fuse box and inspect the signal fuse ①.

Signal fuse: 10 A

Is the signal fuse OK?

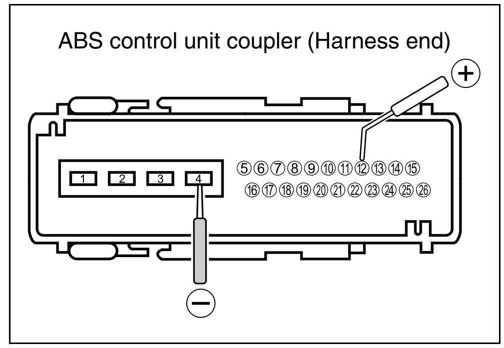
YES	Go to step 4.
NO	Replace the signal fuse.

CAUTION

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.

Step 4

1) Disconnect the ABS control unit coupler. (☞Page 85)
2) Turn the ignition switch to ON with the ABS control unit coupler disconnected, measure the voltage between ⑫ terminal and ④ terminal at the coupler.



DATA **Normal value: 7.5 – 9.5 V and more**

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

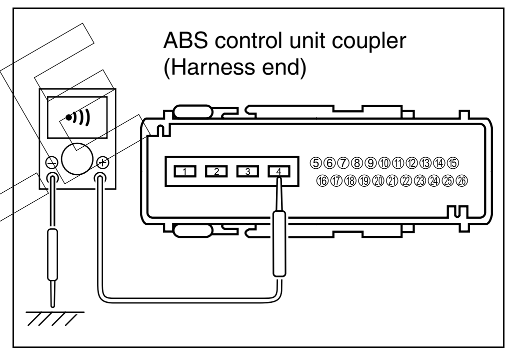
Tester knob indication: Voltage (⎓)

Is the voltage between ⑫ and ④ normal?

YES	Go to step 5.
NO	Inspect the wire harness. (Faulty indicator light wire or ground wire) Faulty ABS indicator light.

Step 5

1) Turn the ignition switch to OFF.
2) Check for continuity between ④ terminal of coupler and body ground.



Tester knob indication: Continuity (•)))

Are there continuity between ④ and body ground?

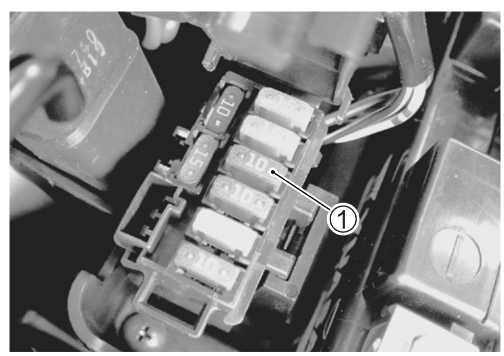
YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty ground wire)

SAMPLE

Step 6

The ABS indicator light does not go off

1) Turn the ignition switch to OFF.
2) Remove the front seat. (☞SV650/SK3 7-4)
3) Open the fuse box and inspect the ignition fuse ①.



Ignition fuse: 10 A

Is the ignition fuse OK?

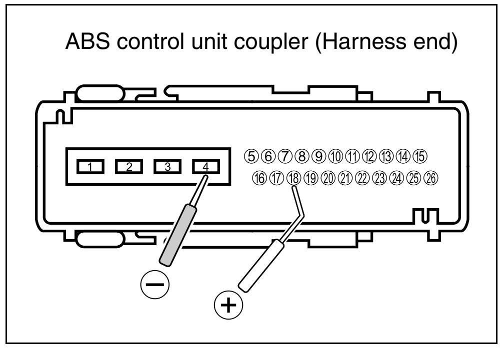
YES	Go to step 7.
NO	Replace the ignition fuse.

CAUTION

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.

Step 7

1) Disconnect the ABS control unit coupler. (☞Page 85)
2) Turn the ignition switch to ON with the ABS control unit coupler disconnected, measure the voltage between ⑱ terminal and ④ terminal at the coupler.



DATA **Normal value: Battery voltage (12.0 V and more)**

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

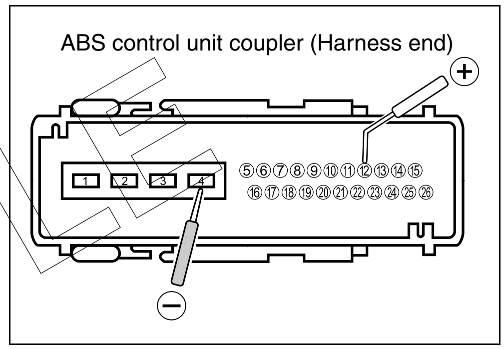
Tester knob indication: Voltage (⎓)

Is the voltage between ⑱ and ④ normal?

YES	Go to step 8.
NO	Inspect the wire harness. (Faulty ignition wire or ground wire)

Step 8

1) Measure the voltage between ⑫ terminal and ④ terminal at the coupler.



DATA **Normal value: 7.5 – 9.5 V and more**

Tester knob indication: Voltage (⎓)

Is the voltage between ⑫ and ④ normal?

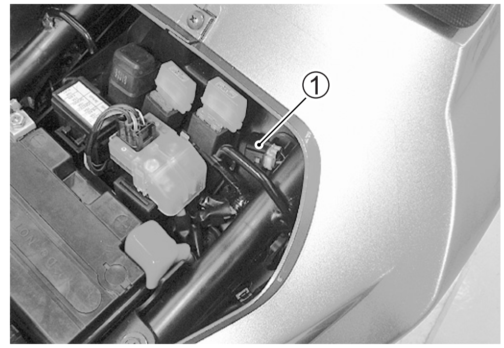
YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty indicator light wire or ground wire)

SAMPLE

DTC (Diagnostic Trouble Code) OUTPUT

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

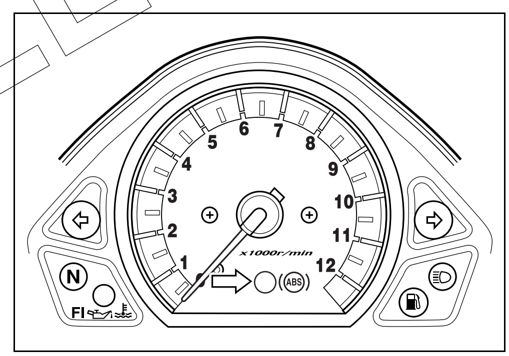
- Turn the ignition switch to OFF.
- Remove the front seat. (☞SV650/SK3 7-4)
- Connect the special tool to the mode select coupler ① (Orange – B/W).



TOOL 09930-82710: Mode select switch



- Switch the special tool to ON.
- Turn the ignition switch to ON.
  The ABS indicator light starts flashing to indicate the DTC.



NOTE:

** If there is a DTC recorded, the ABS indicator light repeatedly flashes in a cyclic manner. (However, when five minutes have elapsed from the start of self-diagnosis mode, the output of the DTC will be interrupted.)*

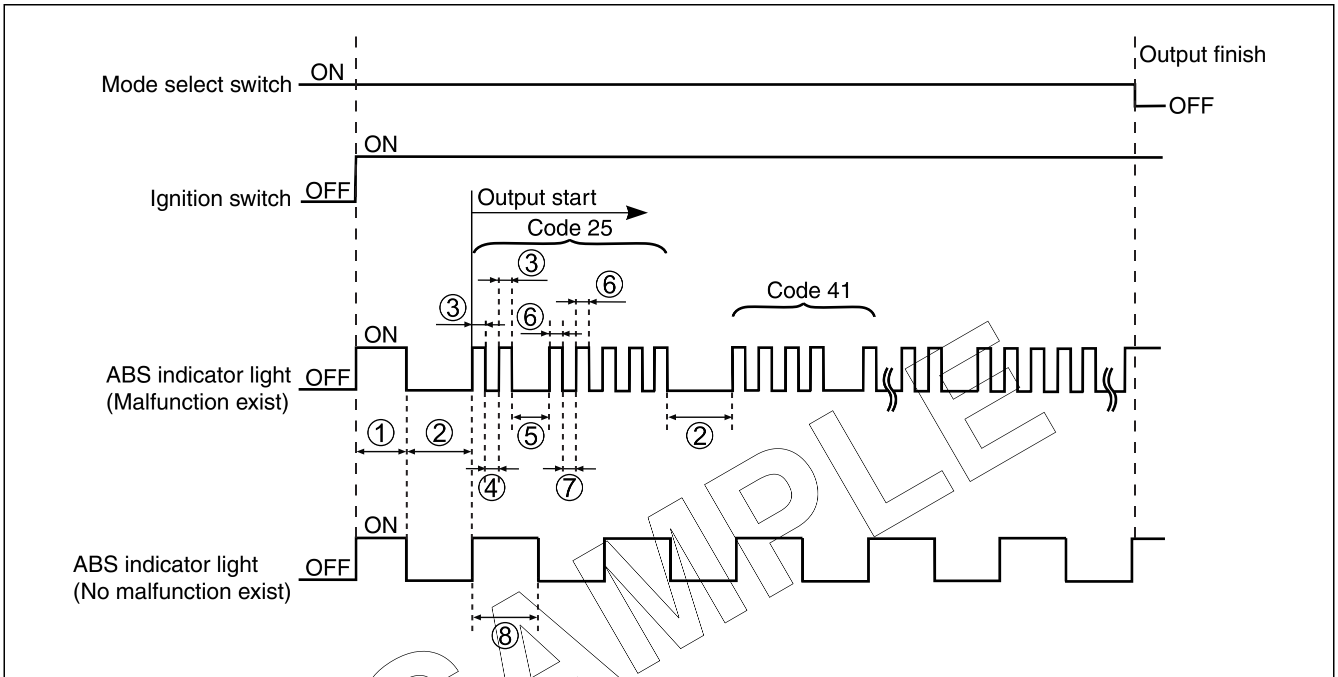
** If no DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.*

** In the case that the mode select switch is turned off or the vehicle speed (both wheels) exceeds 10 km/h (6.2 mile/h), the output of DTC will be interrupted.*

SAMPLE

UNDERSTANDING THE DTC (Diagnostic Trouble Code)

A two-digit DTC is shown through the flashing pattern of the ABS indicator light. A number between 1 and 9 is represented by the number of times that the ABS indicator light lights up in interval of 0.4 seconds and the separation between the tens and ones are indicated by the light staying off for 1.6 seconds. In addition, the separation between the start code and the DTC is indicated by the light being off for 3.6 seconds. After the start code is displayed, DTCs appear from the smallest number code.
If no DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.



SAMPLE

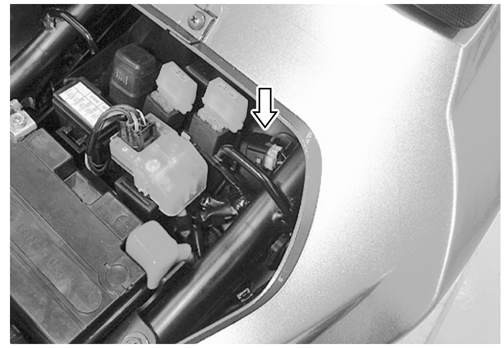
① About 2 seconds (Initial minimum light ON time)
② 3.6 seconds
③ 0.4 seconds (Main code light ON time)
④ 0.4 seconds (Main code light OFF time)
⑤ 1.6 seconds (Main-sub code interval)
⑥ 0.4 seconds (Sub code light ON time)
⑦ 0.4 seconds (Sub code light OFF time)
⑧ 3.6 seconds

DTC DELETING AND ABS OPERATION CHECK

DTC DELETING

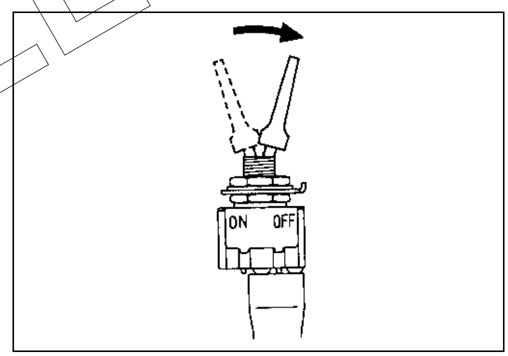
- Connect the special tool to the mode select coupler (Orange – B/W) and output the DTCs.

TOOL **09930-82710: Mode select switch**





- While the DTCs are being output, set the special tool to OFF.

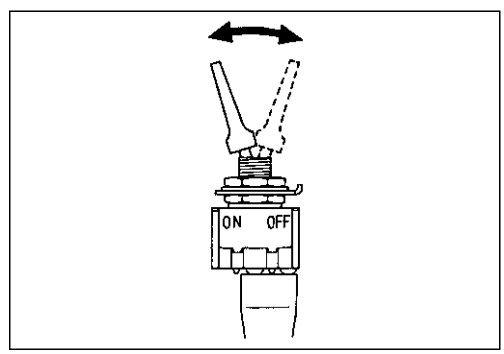


CAUTION

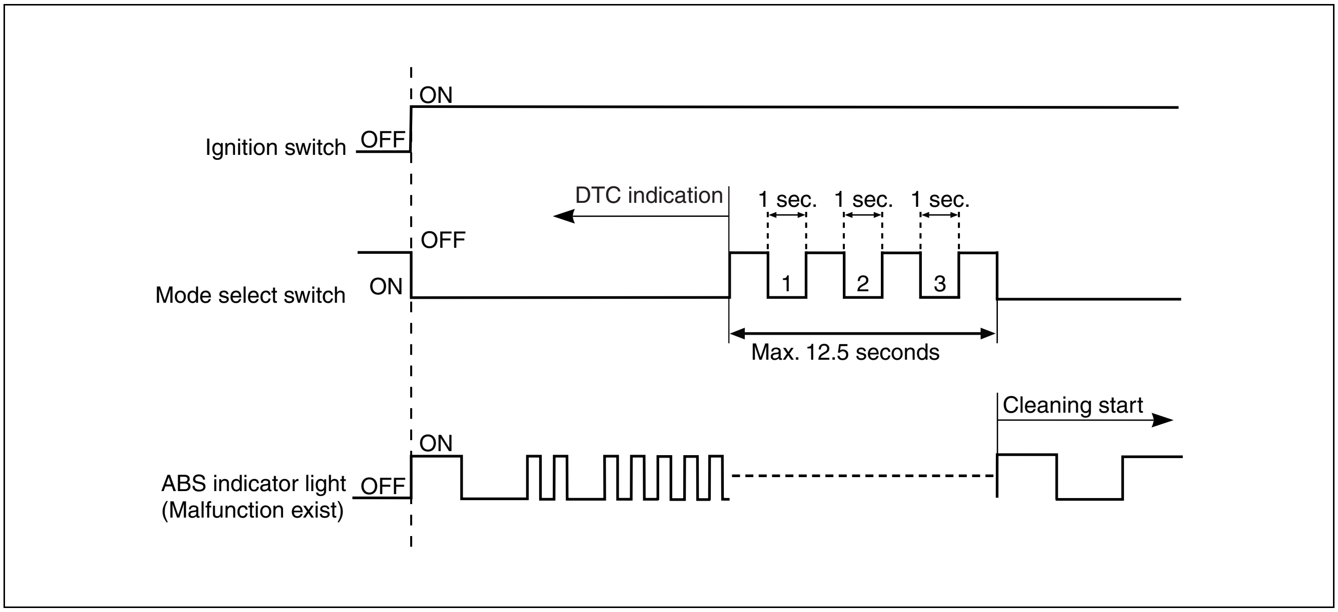
The DTC deletion mode starts 12.5 seconds after the switch is set to OFF.

SAMPLE

- In the DTC deletion mode, switch the ABS test switch from OFF to ON 3 times, each time leaving it at ON for more than 1 second.



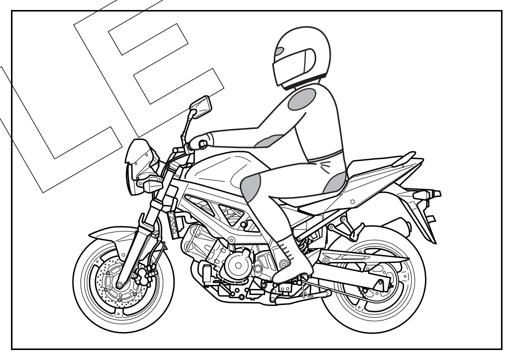
NOTE:
After deleting DTC with the mode select switch in ON position, the system resumes the self-diagnosis mode again and outputs the DTC.



ABS OPERATION CHECK

After deleting the DTCs, repeat the code output procedure and make sure that no DTCs remain (the ABS indicator light no longer flashes). If any DTCs remain, perform the appropriate procedures, then delete the codes. If DTCs are left stored, confusion may occur and unnecessary repairs may be made.

Afterwards, ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.



SAMPLE

SDS CHECK

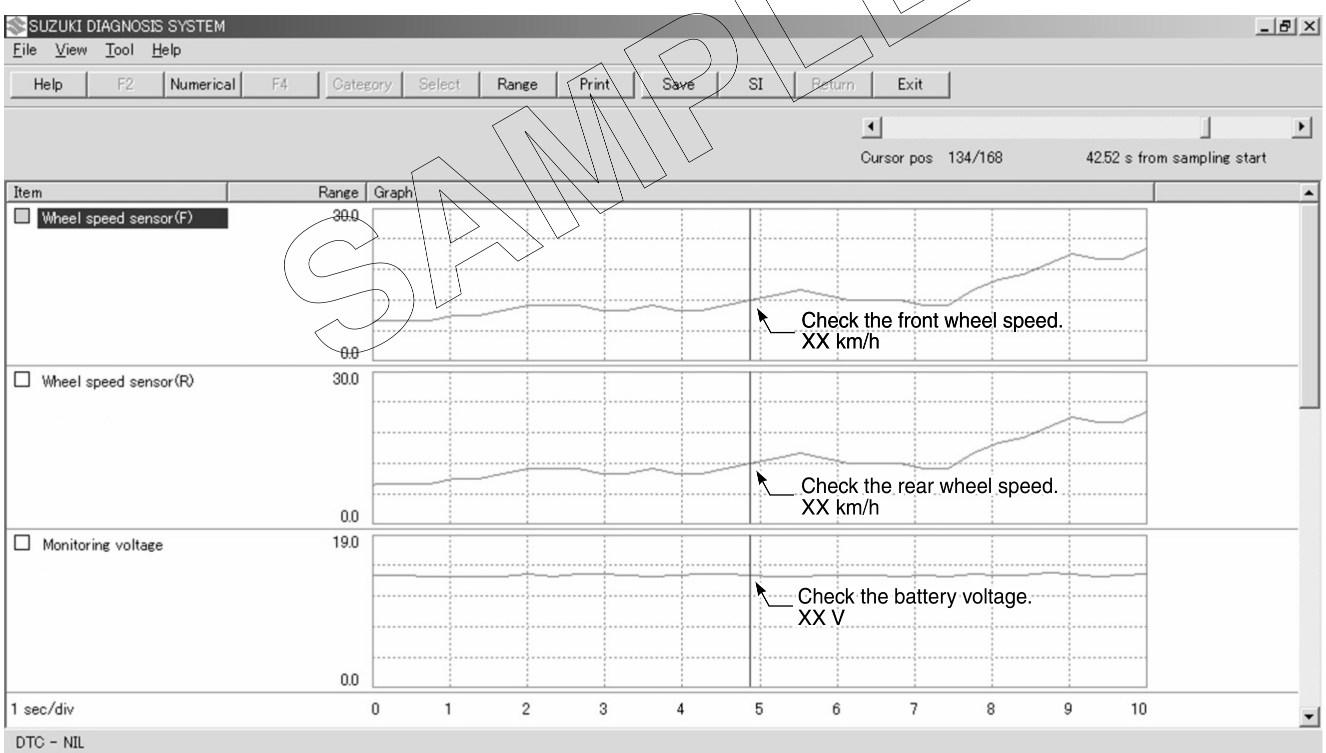
Using SDS, take the sample of data from the new motorcycle and at the time of periodic maintenance at your dealership.
Save the data in the computer or by printing and filing the hard copies. The saved or filed data are useful for troubleshooting as they can be compared periodically with changes over time or failure conditions of the motorcycle.
For example, when a motorcycle is brought in for service but the troubleshooting is difficult, comparison with the normal data that have been saved or filed can allow the specific ABS failure to be determined.

- Remove the right frame side cover. (☞SV650/SK3 7-4)
- Set up the SDS tool. (☞Page 94)

TOOL **09904-41010: SDS set tool**
99565-01010-009: CD-ROM Ver. 9

NOTE:
** Before taking the sample of data, check and clear the Past DTC. (☞Page 95)*
** A number of different data under a fixed condition as shown below should be saved or filed as sample.*

DATA SAMPLED FROM ABS HU SYSTEM



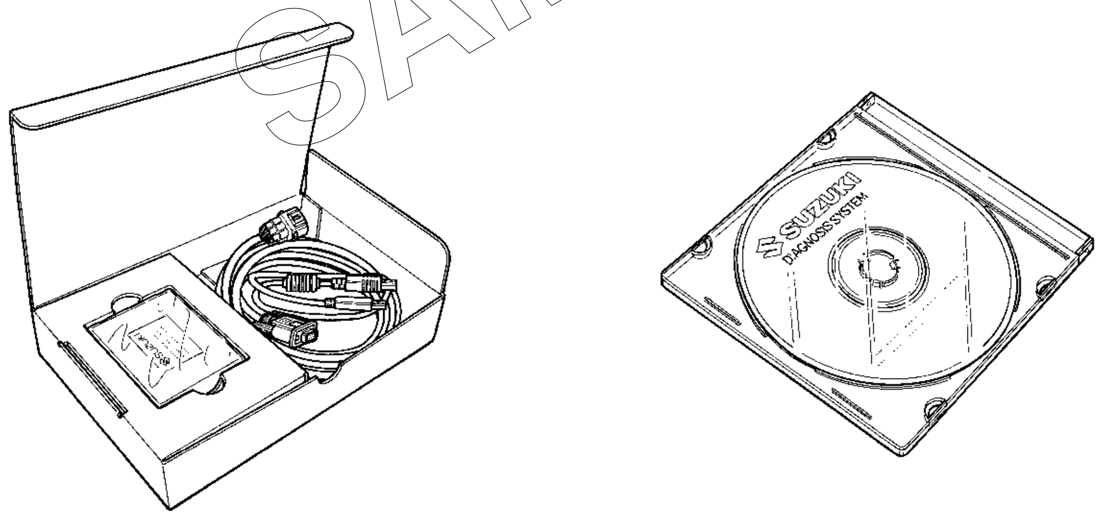
USE OF SDS DIAGNOSTIC PROCEDURES

** Don't disconnect couplers from ABS HU, the battery cable from the battery, ABS HU ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ABS HU memory.*
** DTC stored in ABS HU memory can be checked by the SDS.*
** Be sure to read "CAUTIONS IN SERVICING" (☞Page 72) before inspection and observe what is written there.*

- Remove the right frame side cover. (☞SV650/SK3 7-4)
- Set up the SDS tool. (Refer to the SDS operation manual for further details)
- Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.
- Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- How to use trigger. (Refer to the SDS operation manual for further details.)



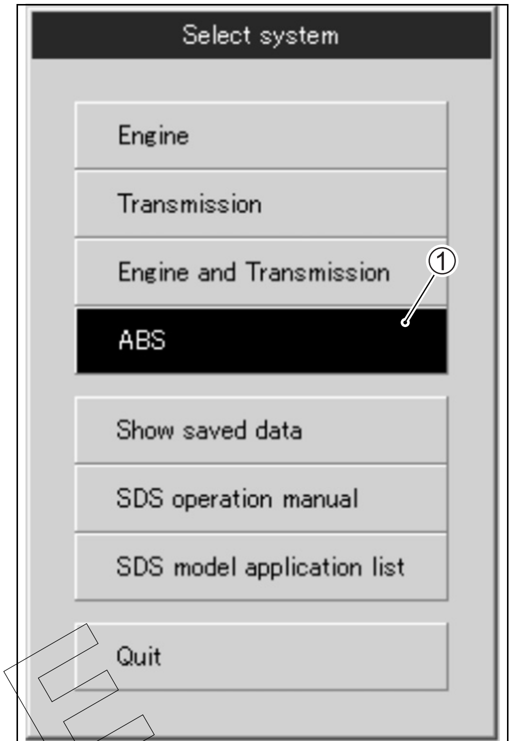
TOOL **09904-41010: SDS set tool**
99565-01010-009: CD-ROM Ver. 9



SAMPLE

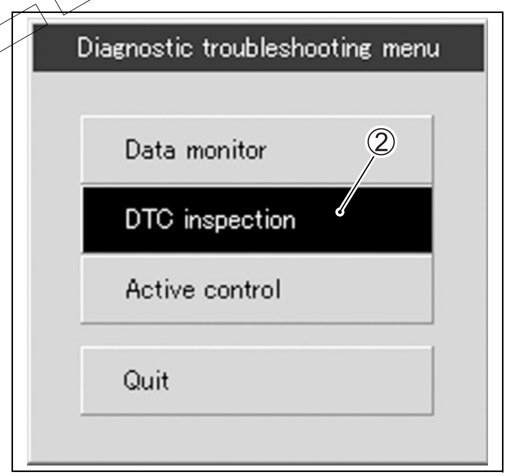
USE OF SDS DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- Click the ABS button ①.

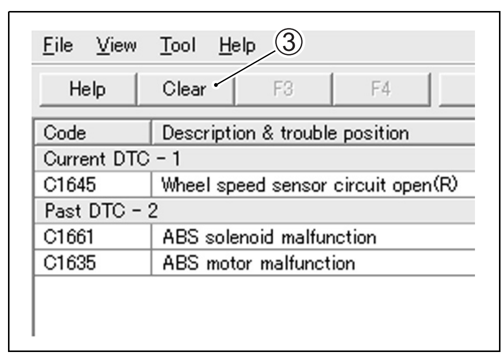


- Click the "DTC inspection" button ②.
- Check the DTC.
- The previous malfunction history code (Past DTC) still remains stored in the ABS HU. Therefore, erase the history code memorized in the ABS HU using SDS tool.

NOTE:
The DTC is memorized in the ABS HU also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

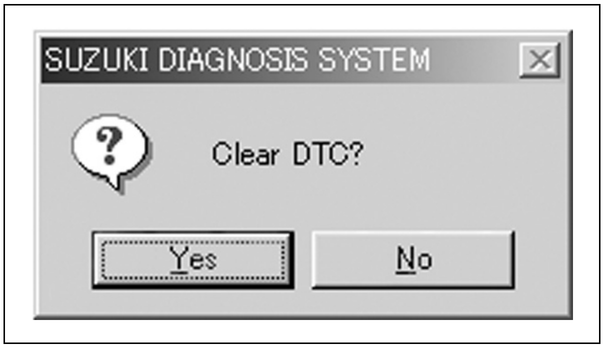


- Click "Clear" ③ to delete history code (Past DTC).



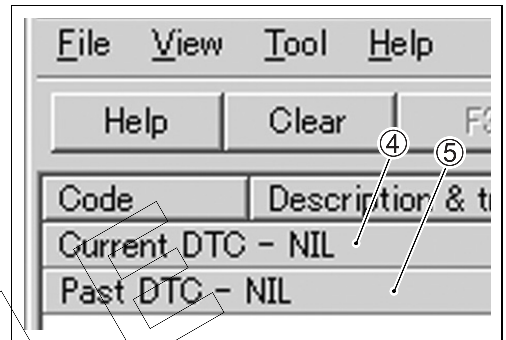
SAMPLE

• Follow the displayed instructions.





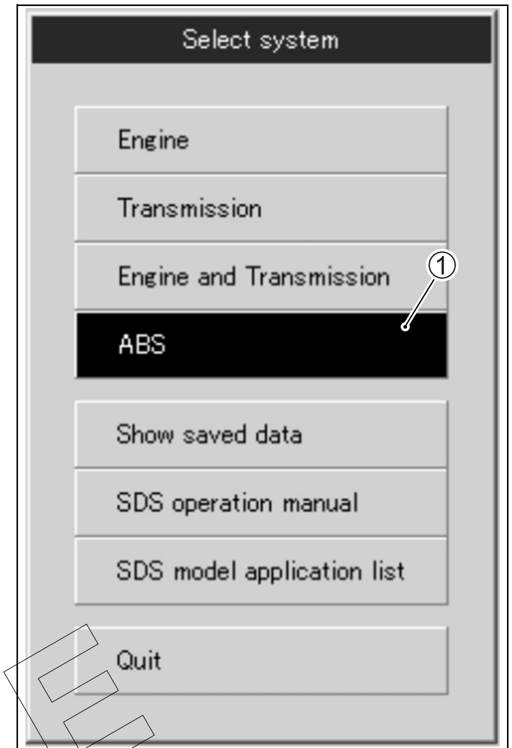
• Check that both "Current DTC" ④ and "Past DTC" ⑤ are deleted (NIL).



SAMPLE

ACTIVE CONTROL INSPECTION

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Turn the ignition switch ON.
3) Click "ABS" ①.



4) Click "Active control" ②.

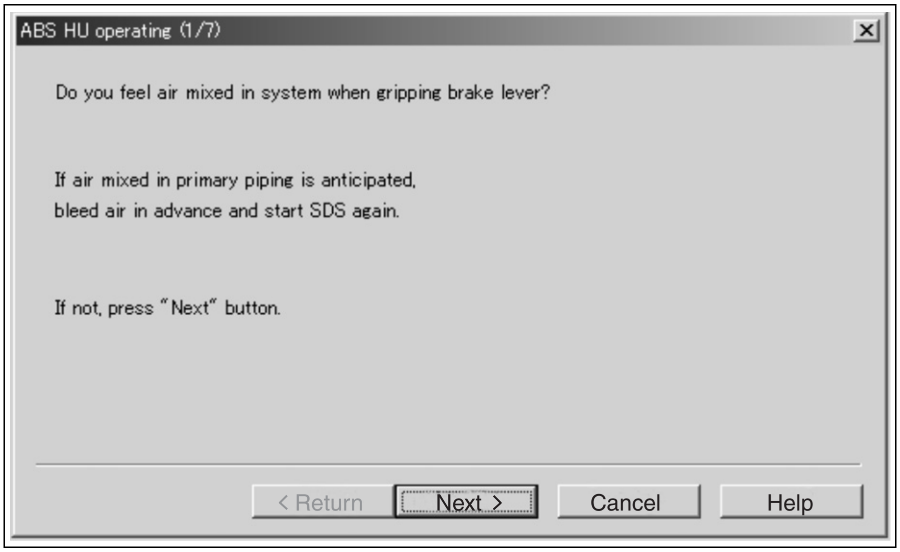


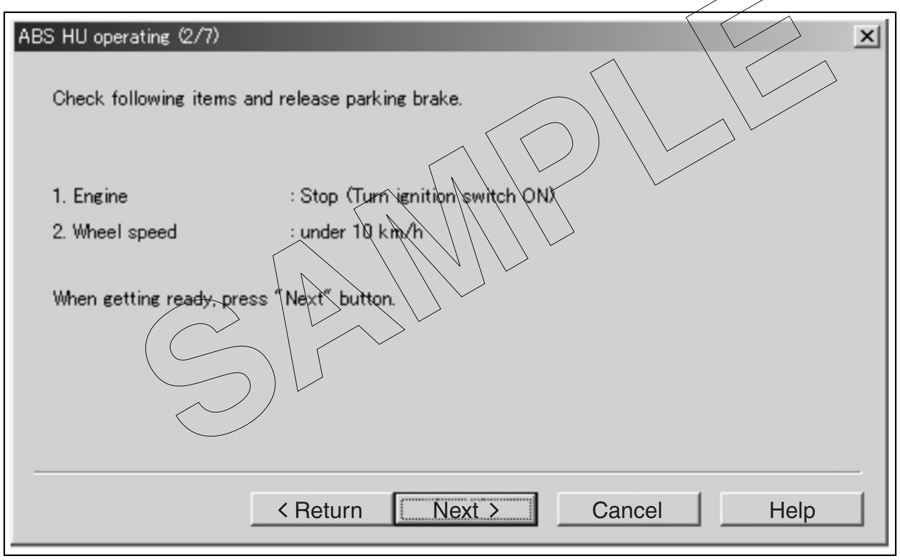
5) Click "ABS HU operating" ③.



SAMPLE

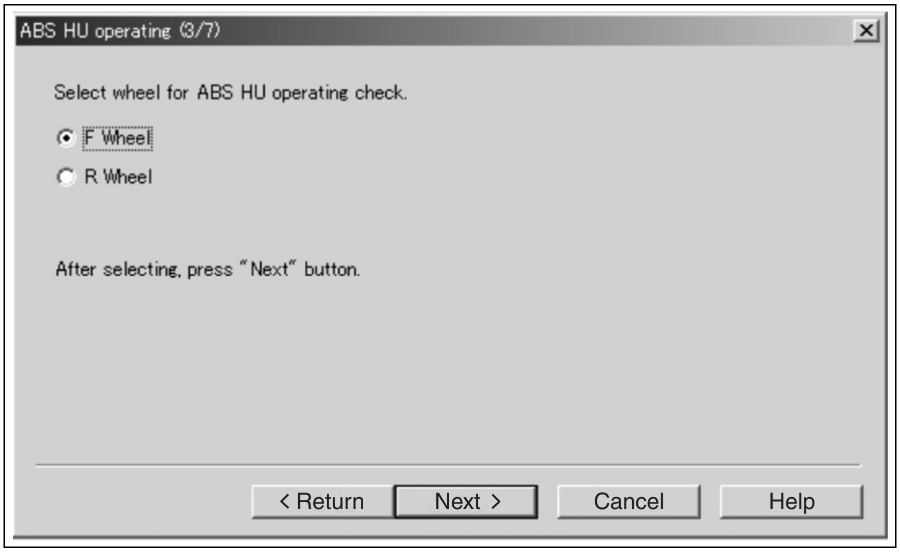
6) It progresses to the next according to the following indication of screens.



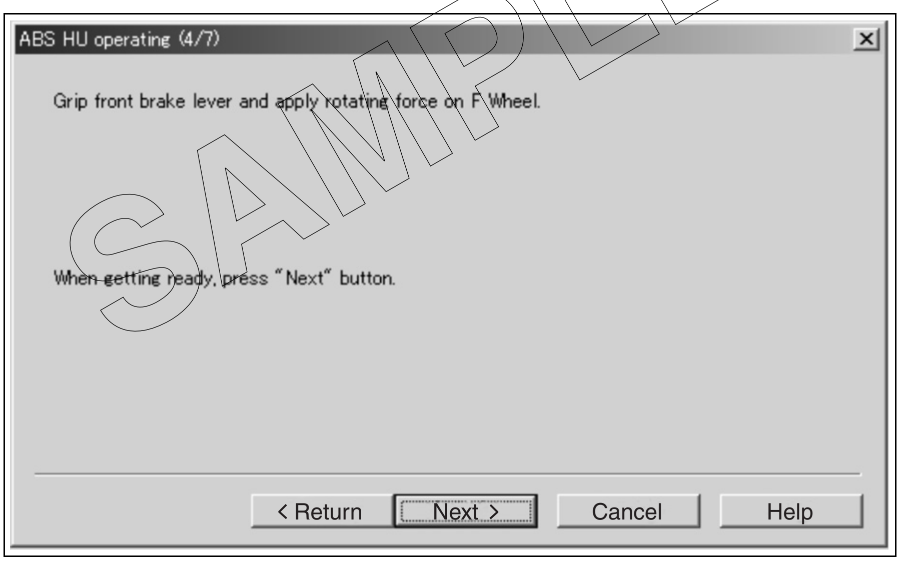


SAMPLE

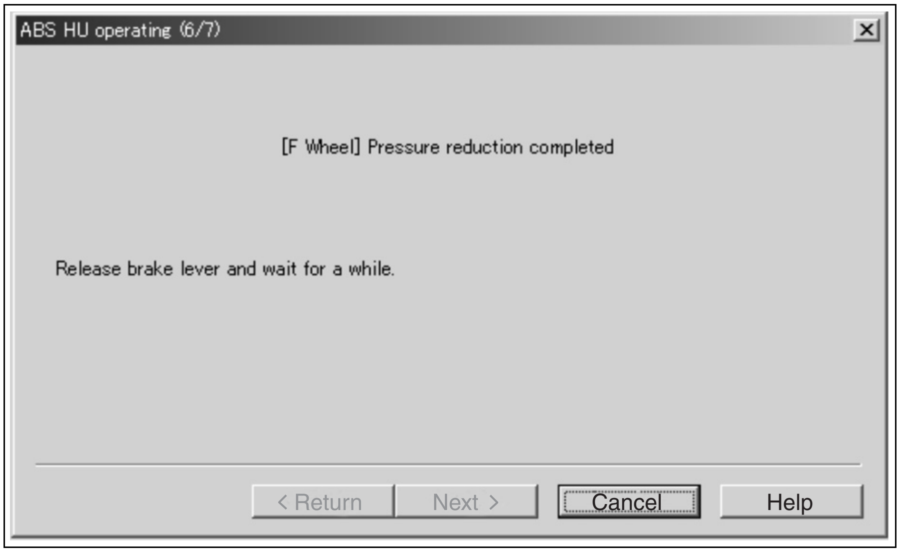
NOTE:
Skip this screen as this vehicle is not equipped with parking brake.



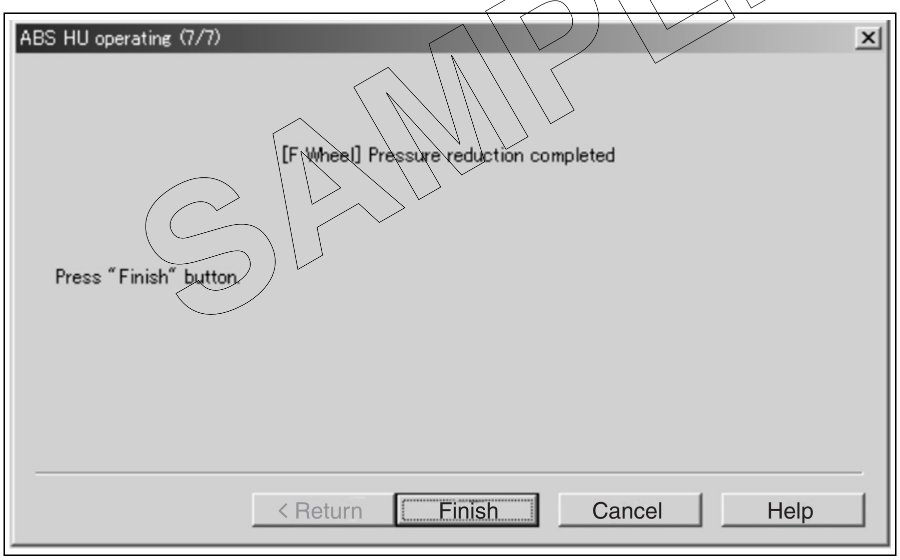
NOTE:
* *If the front wheel is selected, lift the front wheel off the ground using a jack.*
* *Two operators are needed in this work; One should apply a rotational force to the front wheel.*



SAMPLE



NOTE:
* *In normal cases, the front brake lever feels a reaction force and the front wheel turns discontinuously. At the same time, the ABS HU operating sound will be heard.*
* *The ABS HU motor operates for 6 seconds and then stops automatically.*



SAMPLE

NOTE:
* *Inspect the rear brake as the same manner of front brake.*
* *If the ABS does not function, the cause may lie in the ABS control unit/HU.*
* *In checking the rear brake at the time of pressure reduction drive (4/7), "brake lever" appears on the screen. This is because the present screen shares with other model having front brake only.*
  Therefore, in the case of rear brake pedal equipped vehicle, ignore this instruction and operate the rear brake pedal.

DTC TABLE OF ABS

DTC No.	DTC parameter / Possible cause	Indicator status	Page
None	Normal	ON *1	—
25 (C1625)	Wheel speed sensor related malfunction	ON	☞ Page 102
	Incorrect tire size, poor tire pressure, deformed wheel, wheel spinning, incorrect tooth count, interference at one or more wheels, permanent bad signal, etc.	ON	
35 (C1635)	ABS motor malfunction	ON	☞ Page 104
	Motor relay circuit open or short, broken fuse for motor relay, pump motor circuit open or short, faulty motor relay, faulty ABS motor, faulty ABS control unit, etc.		
41 (C1641)	Wheel speed sensor signal malfunction (F) *2	ON	☞ Page 105
	Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.		
42 (C1642)	Wheel speed sensor circuit open (F) *2	ON	☞ Page 106
	Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.		
44 (C1644)	Wheel speed sensor signal malfunction (R) *2	ON	☞ Page 109
	Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.		
45 (C1645)	Wheel speed sensor circuit open (R) *2	ON	☞ Page 110
	Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.		
47 (C1647)	Supply voltage (Increased)	ON *3	☞ Page 113
	Faulty regulator/rectifier, faulty battery, faulty wire harness, etc.		
48 (C1648)	Supply voltage (Decreased)	ON *3	☞ Page 115
	Faulty generator, faulty regulator/rectifier, faulty battery, faulty wire harness, etc.		
55 (C1655)	ABS control unit malfunction	(ON) *4	☞ Page 117
	Faulty ABS control unit		
61 (C1661)	ABS solenoid malfunction	ON	☞ Page 118
	Valve relay circuit open or short, broken fuse for valve relay, faulty valve relay, interruption of valve, failure output from ABS control unit, etc.		

SAMPLE

*1 It goes off after running at more than 5 km/h (3.1 mile/h).
*2 The wheel speed sensor lead wire is connected to the ABS control unit, but a short-circuit or faulty continuity inside the ABS control unit caused this DTC to appear, therefore, the ABS control unit/HU assembly must be replaced. An insufficient wheel speed sensor output voltage is the cause of a malfunction in which the ABS is activated even if the brakes are not suddenly applied. If this occurs frequently even though the wheel speed sensor is operating correctly, the ABS control unit/HU assembly should be replaced.
*3 When the voltage resumes the normal level, the ABS indicator light will go off.
*4 There are times that the ABS indicator light does not light up.

CAUTION

When disconnecting couplers and turning the ignition switch to ON, disconnect the ABS control unit coupler in order to prevent a DTC from being stored. Each time a resistance is measured, the ignition switch should be set to OFF.

DTC TROUBLESHOOTING

DTC "25" (C1625): WHEEL SPEED SENSOR RELATED MALFUNCTION

POSSIBLE CAUSE
Incorrect tire size, poor tire pressure, deformed wheel, wheel spinning, incorrect tooth count, interference at one or more wheels, permanent bad signal, etc.

Step 1

1) Check that the specified tires are installed.



TIRE TYPE:

Front: DUNLOP D220FST 120/60ZR17M/C 55W (SV650A)

: DUNLOP D220FST M 120/60ZR17M/C 55W (SV650SA)

Rear: DUNLOP D220ST L 160/60ZR17M/C 69W

Are the tires OK?

YES	Go to step 2.
NO	Use the specified tires.

Step 2

1) Make sure the tire pressure for each tire.
(☞SV650/SK3 2-29)



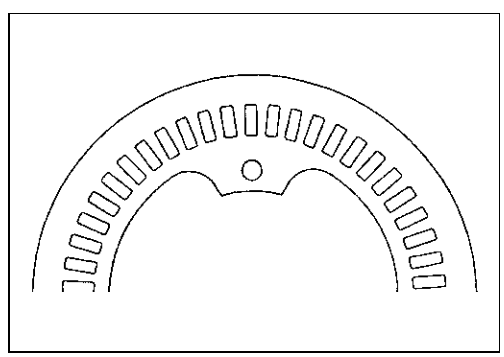
COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm²	psi	kPa	kgf/cm²	psi
FRONT	225	2.25	33	225	2.25	33
REAR	250	2.50	36	250	2.50	36

Is the tire pressure for each tire correct?

YES	Go to step 3.
NO	Adjust the tire pressure.

Step 3

1) Inspect both wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings.



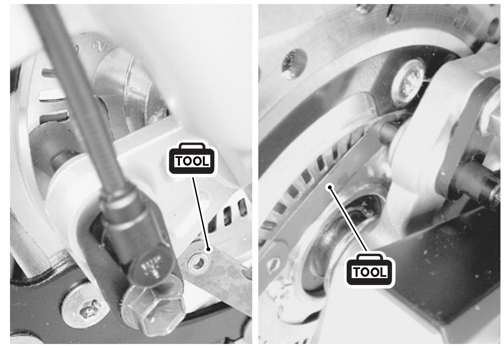
Are the rotors OK?

YES	Go to step 4.
NO	Clean or replace the rotor.

SAMPLE

Step 4

1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge.



DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge

Are the clearances OK?

YES	Replace the ABS control unit/HU.
NO	Adjust the clearance.

SAMPLE

DTC "35" (C1635): ABS MOTOR MALFUNCTION

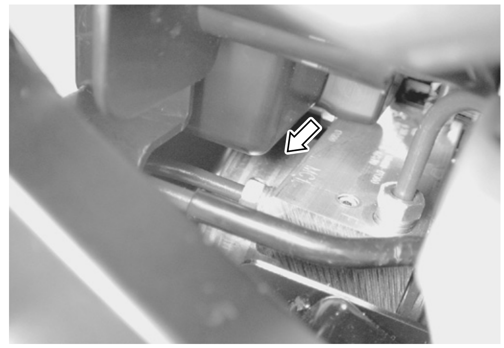
POSSIBLE CAUSE
Motor relay circuit open or short, broken fuse for motor relay, pump motor circuit open or short, faulty motor relay, faulty ABS motor, faulty ABS control unit, etc.

Step 1

1) Inspect if the pump motor makes turning noise by setting the ignition switch to ON from OFF when the vehicle stands still.

   Does the pump motor make any turning noise?

YES	Faulty HU motor Replace the ABS control unit/HU.
NO	Go to step 2.



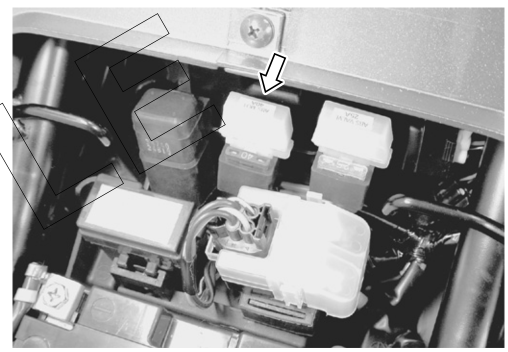
Step 2

1) Remove the front seat. (☞SV650/SK3 7-4)
2) Inspect the ABS motor fuse.

   ABS motor fuse: 40 A

   Is the ABS motor fuse OK?

YES	Go to step 3.
NO	Replace the ABS motor fuse.



CAUTION

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.

SAMPLE

Step 3

1) Turn the ignition switch to OFF.
2) Remove the ABS control unit/HU cover. (☞Page 84)
3) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)
4) Measure the voltage between ② terminal and ① terminal at the coupler.

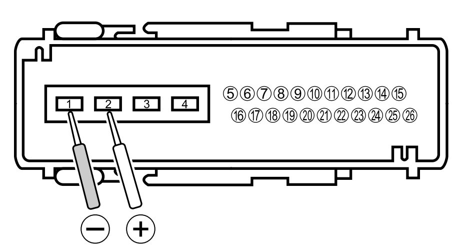
DATA Normal value: Battery voltage (12.0 V and more)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage between ② and ① normal?

ABS control unit coupler (Harness end)



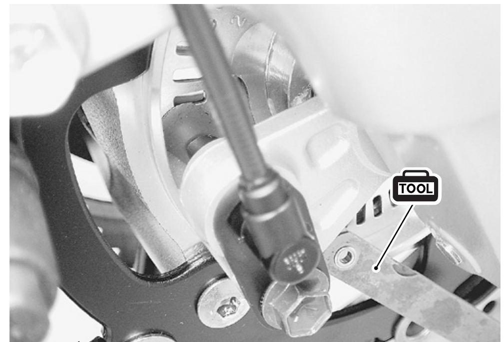
YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty motor power supply or ground wire)

DTC "41" (C1641): WHEEL SPEED SENSOR SIGNAL MALFUNCTION (F)

POSSIBLE CAUSE
Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.

Step 1

1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge.



DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

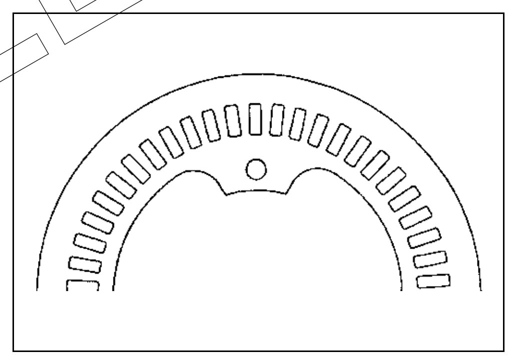
TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge

Is the clearance OK?

YES	Go to step 2.
NO	Adjust the clearance.

Step 2

1) Inspect the front wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.



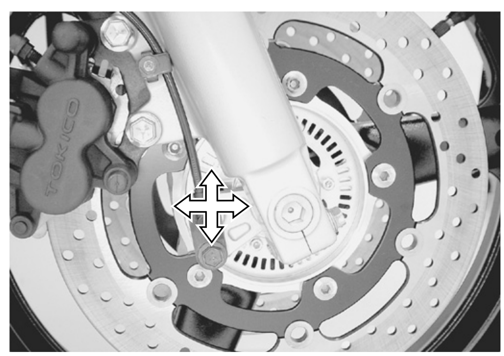
Is the sensor rotor OK?

YES	Go to step 3.
NO	Clean or replace the sensor rotor.

SAMPLE

Step 3

1) Check that the front wheel speed sensor is mounted steadily.



Is the sensor mounted steadily?

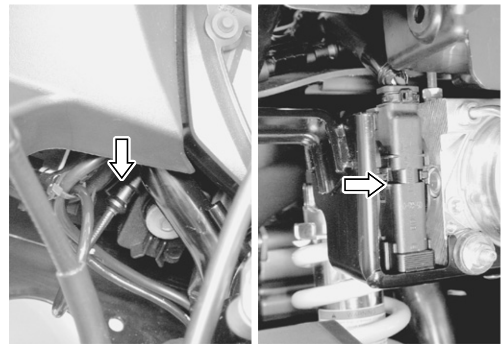
YES	Go to DTC "42" (C1642). (☞Page 106)
NO	Tighten the mounting bolts or replace the bracket if necessary.

DTC "42" (C1642): WHEEL SPEED SENSOR CIRCUIT OPEN (F)

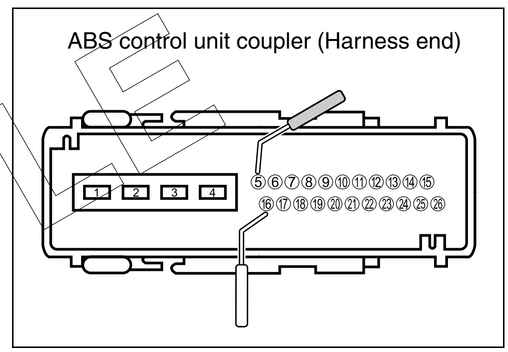
POSSIBLE CAUSE
Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.

Step 1

1) Turn the ignition switch to OFF.
2) Remove the ABS control unit/HU cover. (☞Page 84)
3) Remove the headlight. (SV650A) (☞SV650/SK3 8-37)
4) Check the ABS control unit coupler and front wheel speed sensor coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)



5) Check for continuity between ⑯ terminal and ⑤ terminal at the ABS control unit coupler.



TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Continuity (•)))

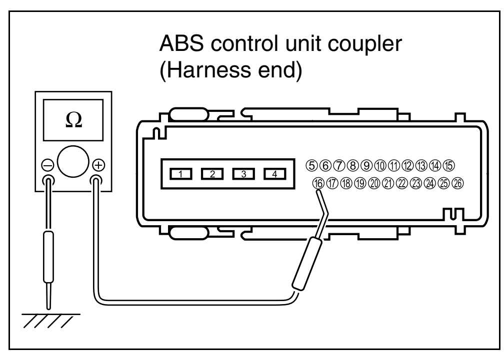
Is there continuity between ⑯ and ⑤?

SAMPLE

YES	Inspect the wire harness. (Faulty sensor wire) Faulty front wheel speed sensor
NO	Go to step 2.

Step 2

1) Measure the resistance between ⑯ terminal and ground at the ABS control unit coupler.



DATA **Normal value: ∞ Ω (Infinity)**

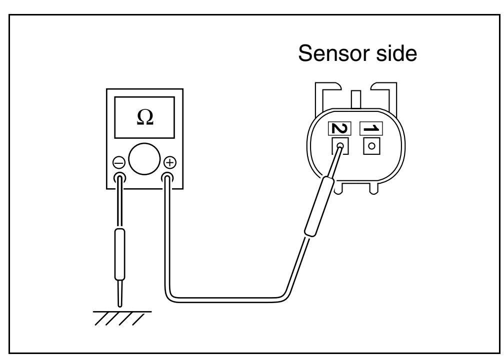
Tester knob indication: Resistance (Ω)

Is the resistance between ⑯ and ground OK?

YES	Go to step 4.
NO	Go to step 3.

Step 3

1) Disconnect the front wheel speed sensor coupler.
2) Measure the resistance between ② terminal and ground at the front wheel speed sensor coupler.



DATA **Normal value: ∞ Ω (Infinity)**

Tester knob indication: Resistance (Ω)

Is the resistance between ② and ground OK?

YES	Inspect the wire harness. (Faulty W/R wire)
NO	Faulty front wheel speed sensor

Step 4

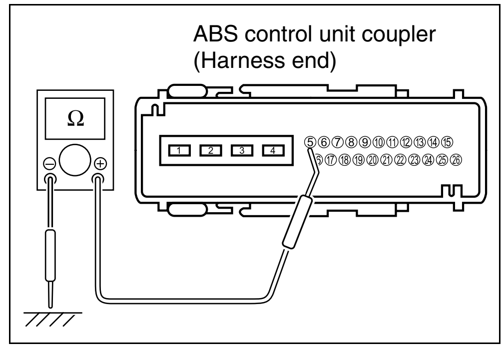
1) Measure the resistance between ⑤ terminal and ground at the ABS control unit coupler.

DATA Normal value: ∞ Ω (Infinity)

Tester knob indication: Resistance (Ω)

Is the resistance between ⑤ and ground OK?

YES	Go to step 6.
NO	Go to step 5.



Step 5

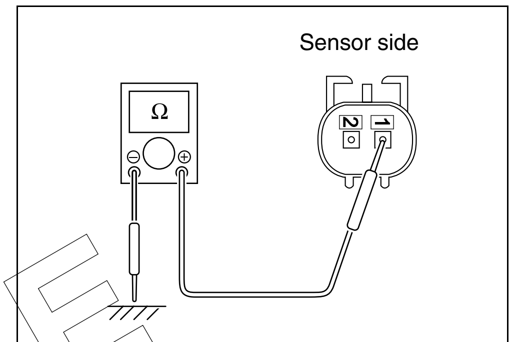
1) Measure the resistance between ① terminal and ground at the front wheel speed sensor coupler.

DATA Normal value: ∞ Ω (Infinity)

Tester knob indication: Resistance (Ω)

Is the resistance between ① and ground OK?

YES	Inspect the wire harness. (Faulty B/R wire)
NO	Faulty front wheel speed sensor



Step 6

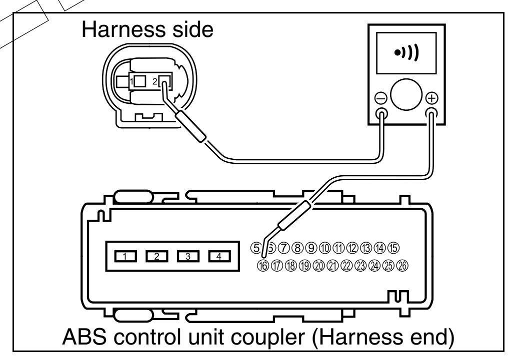
1) Check for continuity between ⑯ terminal on the ABS control unit coupler and ② terminal on the front wheel speed sensor coupler.

DATA Normal value: Continuity (•)))

Tester knob indication: Continuity test (•)))

Is there continuity between ⑯ and ②?

YES	Go to step 7.
NO	Inspect the wire harness. (Faulty W/R wire)



Step 7

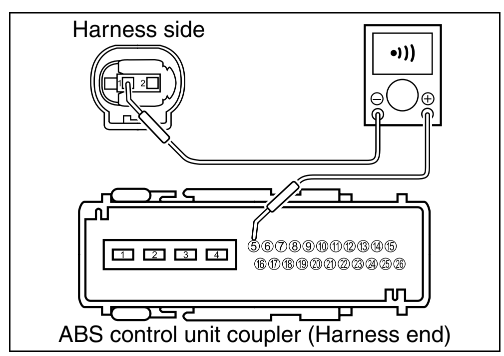
1) Check for continuity between ⑤ terminal on the ABS control unit coupler and ① terminal on the front wheel speed sensor coupler.

DATA Normal value: Continuity (•)))

Tester knob indication: Continuity test (•)))

Is there continuity between ⑤ and ①?

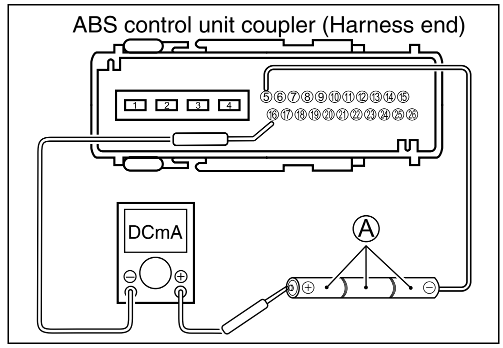
YES	Go to step 8.
NO	Inspect the wire harness. (Faulty B/R wire)



SAMPLE

Step 8

1) Connect the front wheel speed sensor coupler.
2) Connect three 1.5 V dry cells Ⓐ in series as shown and make sure that their total voltage is more than 4.5 V.
   Measure the current between ⊕ dry cell terminal and ⑯ terminal on the ABS control unit coupler.



DATA Normal value: 5.9 – 16.8 mA

Tester knob indication: Current (⎓, 20 mA)

Is the current OK?

YES	Replace the ABS control unit/HU.
NO	Faulty front wheel speed sensor.

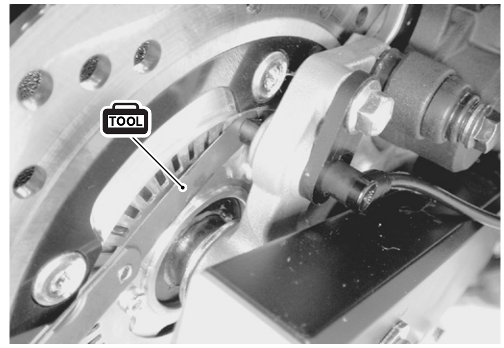
SAMPLE

DTC "44" (C1644): WHEEL SPEED SENSOR SIGNAL MALFUNCTION (R)

POSSIBLE CAUSE
Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.

Step 1

1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge.



DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

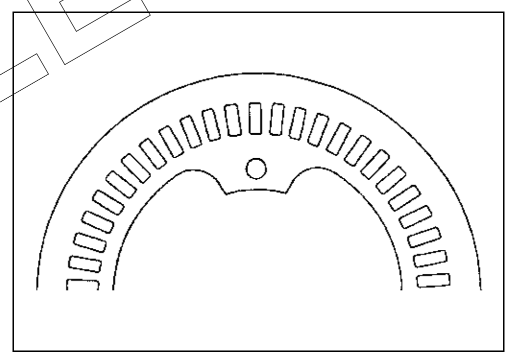
TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge

Is the clearance OK?

YES	Go to step 2.
NO	Adjust the clearance.

Step 2

1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings.



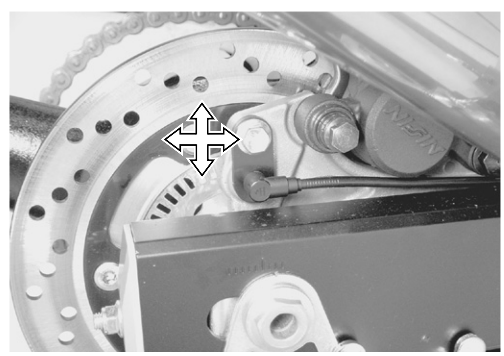
Is the sensor rotor OK?

YES	Go to step 3.
NO	Clean or replace the sensor rotor.

SAMPLE

Step 3

1) Check that the rear wheel speed sensor is mounted steadily.



Is the sensor mounted steadily?

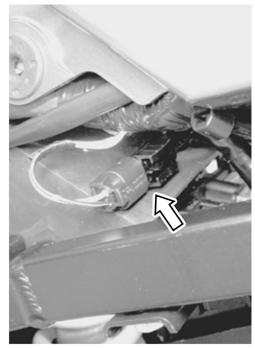
YES	Go to DTC "45" (C1645). (☞Page 110)
NO	Tighten the mounting bolts or replace the bracket if necessary.

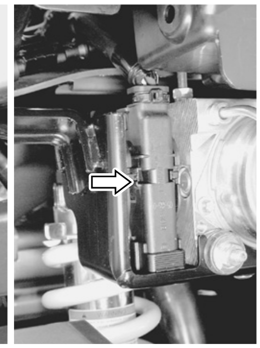
DTC "45" (C1645): WHEEL SPEED SENSOR CIRCUIT OPEN (R)

POSSIBLE CAUSE
Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.

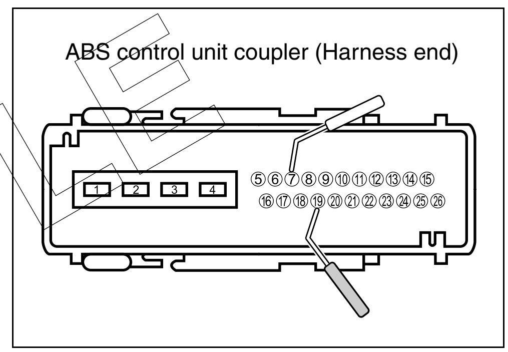
Step 1

1) Turn the ignition switch to OFF.
2) Remove the ABS control unit/HU cover. (☞Page 84)
3) Check the ABS control unit coupler and rear wheel speed sensor coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)





4) Check for continuity between ⑦ terminal and ⑲ terminal at the ABS control unit coupler.



TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Continuity (•)))

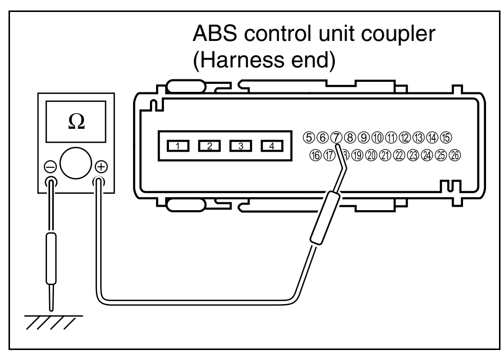
Is there continuity between ⑦ and ⑲?

YES	Inspect the wire harness. (Faulty sensor wire) Faulty rear wheel speed sensor.
NO	Go to step 2.

SAMPLE

Step 2

1) Measure the resistance between ⑦ terminal and ground at the ABS control unit coupler.



DATA **Normal value: ∞ Ω (Infinity)**

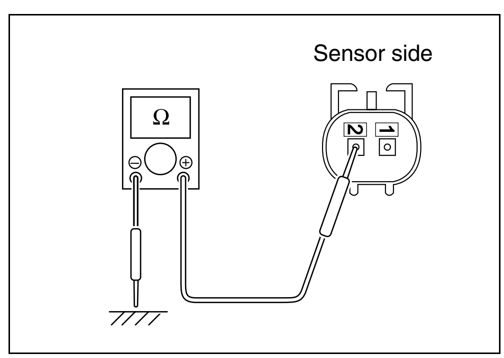
Tester knob indication: Resistance (Ω)

Is the resistance between ⑦ and ground OK?

YES	Go to step 4.
NO	Go to step 3.

Step 3

1) Disconnect the rear wheel speed sensor coupler.
2) Measure the resistance between ② terminal and ground at the rear wheel speed sensor coupler.



DATA **Normal value: ∞ Ω (Infinity)**

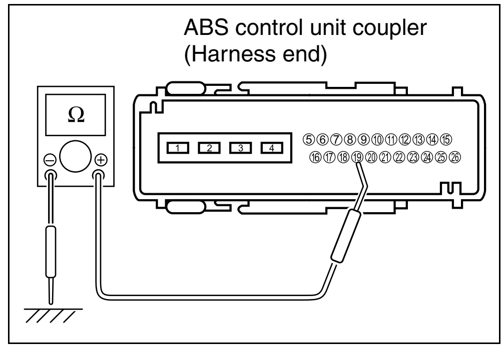
Tester knob indication: Resistance (Ω)

Is the resistance between ② and ground OK?

YES	Inspect the wire harness. (Faulty W/Y wire)
NO	Replace the rear wheel speed sensor.

Step 4

1) Measure the resistance between ⑲ terminal and ground at the ABS control unit coupler.



DATA **Normal value: ∞ Ω (Infinity)**

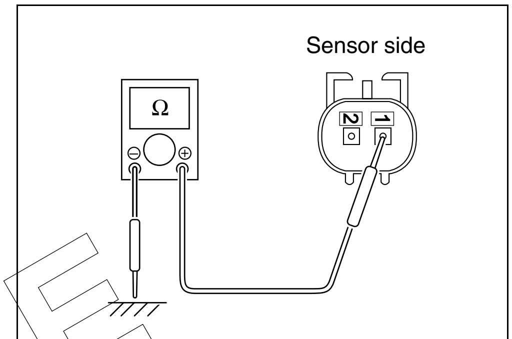
Tester knob indication: Resistance (Ω)

Is the resistance between ⑲ and ground OK?

YES	Go to step 6.
NO	Go to step 5.

Step 5

1) Measure the resistance between ① terminal and ground at the rear wheel speed sensor coupler.



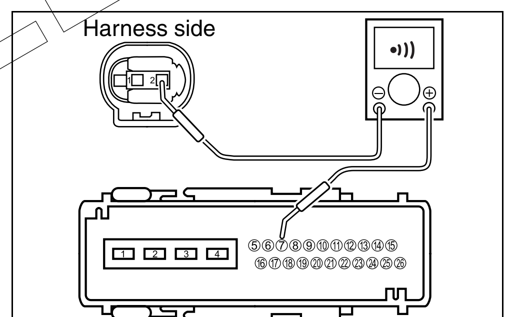
DATA **Normal value: ∞ Ω (Infinity)**

Is the resistance between ① and ground OK?

YES	Inspect the wire harness. (Faulty B/Y wire)
NO	Replace the rear wheel speed sensor.

Step 6

1) Check for continuity between ⑦ terminal on the ABS control unit coupler and ② terminal on the rear wheel speed sensor coupler.



DATA **Normal value: Continuity (•)))**

Tester knob indication: Continuity test (•)))

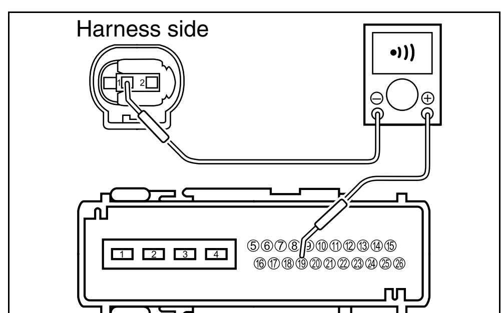
Is there continuity between ⑦ and ②?

YES	Go to step 7.
NO	Inspect the wire harness. (Faulty W/Y wire)

SAMPLE

Step 7

1) Check the continuity between ⑲ terminal on the ABS control unit coupler and ① terminal on the rear wheel speed sensor coupler.



DATA **Normal value: Continuity (•)))**

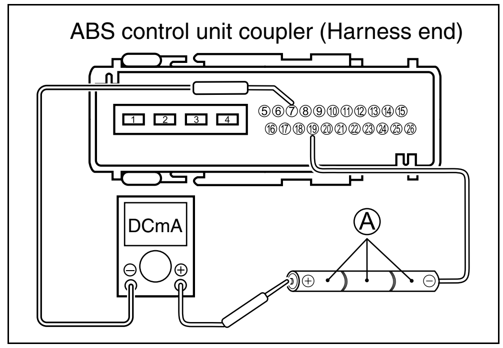
Tester knob indication: Continuity test (•)))

Is there continuity between ⑲ and ①?

YES	Go to step 8.
NO	Inspect the wire harness. (Faulty B/Y wire)

Step 8

1) Connect the rear wheel speed sensor coupler.
2) Connect three 1.5 V dry cells Ⓐ in series as shown and make sure that their total voltage is more than 4.5 V.
   Measure the current between ⊕ dry cell terminal and ⑦ terminal on the ABS control unit coupler.



DATA **Normal value: 5.9 – 16.8 mA**

TOOL **09900-25008: Multi-circuit tester set**
09900-25009: Needle pointed probe set

Tester knob indication: Current (⎓, 20 mA)

Is the current OK?

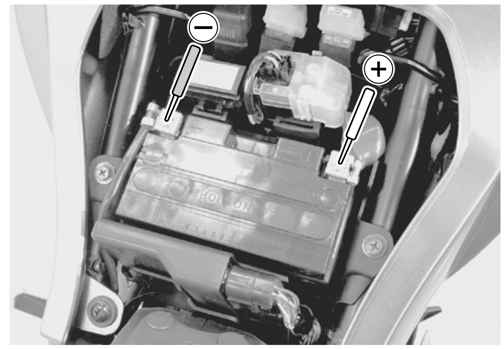
YES	Replace the ABS control unit/HU.
NO	Replace the rear wheel speed sensor.

SAMPLE

DTC "47" (C1647): SUPPLY VOLTAGE (INCREASED)

POSSIBLE CAUSE
Faulty regulator/rectifier, faulty battery, faulty wire harness, etc.

NOTE:
When the voltage resumes the normal level, the ABS indicator light will go off.



Step 1
1) Turn the ignition switch to OFF.
2) Remove the front seat. (☞SV650/SK3 7-4)
3) Measure the voltage between the ⊕ and ⊖ battery terminals using the multi-circuit tester.

DATA **Battery voltage: 12.0 V and more**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

Is the voltage over 12 V?

YES	Go to step 2.
NO	Charge or replace the battery.

Step 2
1) Run the engine at 5 000 r/min with the dimmer switch set to HI.
2) Measure the voltage between the ⊕ and ⊖ battery terminals.

DATA **Regulated voltage: 14.0 – 15.5 V at 5 000 r/min**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

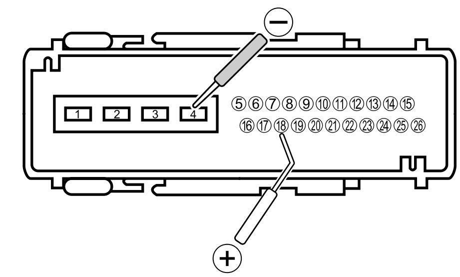
Is the voltage 14.0 – 15.5 V?

YES	Go to step 3.
NO	Inspect the regulator/rectifier. (☞SV650/SK3 8-11)

SAMPLE

Step 3

1) Turn the ignition switch to OFF.
2) Remove the ABS control unit/HU cover. (☞Page 84)
3) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)
4) Run the engine at 5 000 r/min with the dimmer switch set to HI.
5) Measure the voltage between ⑱ terminal and ④ terminal at the coupler.



TOOL 09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage same as step 2 above?

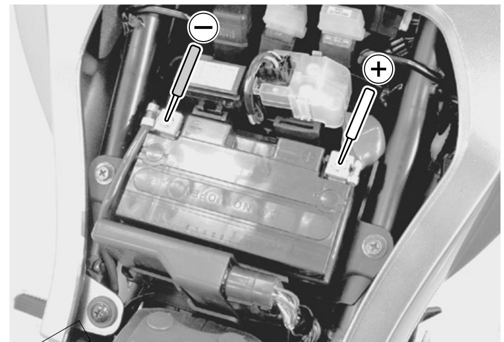
YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty ignition or ground wire)

SAMPLE

DTC "48" (C1648): SUPPLY VOLTAGE (DECREASED)

POSSIBLE CAUSE
Faulty generator, faulty regulator/rectifier, faulty battery, faulty wire harness, etc.

NOTE:
When the voltage resumes the normal level, the ABS indicator light will go off.



Step 1

1) Turn the ignition switch to OFF.
2) Remove the front seat. (SV650/SK3 7-4)
3) Measure the voltage between the ⊕ and ⊖ battery terminals using the multi-circuit tester.

DATA **Battery voltage: 12.0 V and more**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

Is the voltage over 12 V?

YES	Go to step 2.
NO	Charge or replace the battery.

Step 2

1) Run the engine at 5 000 r/min with the dimmer switch set to HI.
2) Measure the voltage between the ⊕ and ⊖ battery terminals.

DATA **Regulated voltage: 14.0 – 15.5 V at 5 000 r/min**

Tester knob indication: Voltage (⎓)

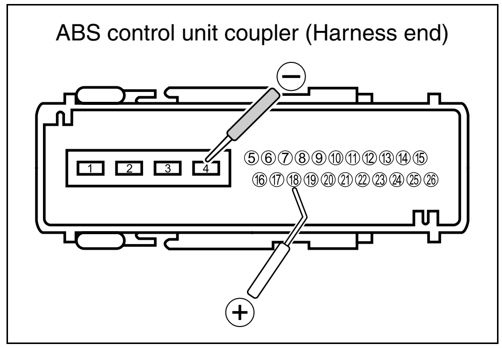
Is the voltage 14.0 – 15.5 V?

YES	Go to step 3.
NO	Inspect the generator and regulator/rectifier. (SV650/SK3 8-10 and -11)

SAMPLE

Step 3

1) Turn the ignition switch to OFF.
2) Remove the ABS control unit/HU cover. (☞Page 84)
3) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)
4) Run the engine at 5 000 r/min with the dimmer switch set to HI.
5) Measure the voltage between ⑱ terminal and ④ terminal at the coupler.



09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage same as step 2 above?

YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty ignition or ground wire)

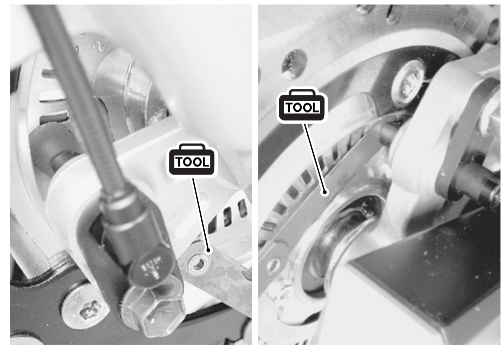
SAMPLE

DTC "55" (C1655): ABS CONTROL UNIT MALFUNCTION

POSSIBLE CAUSE
Faulty ABS control unit

Step 1

1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge.



DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

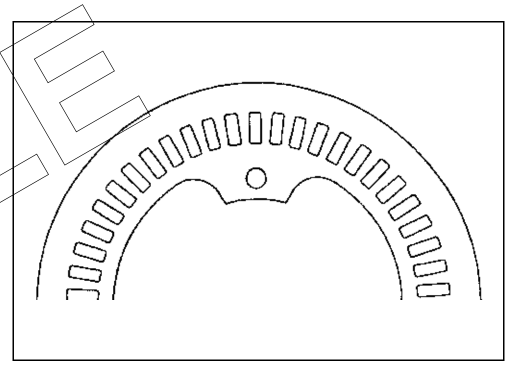
TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge

Are the clearances OK?

YES	Go to step 2.
NO	Adjust the clearance.

Step 2

1) Inspect both of the wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings.



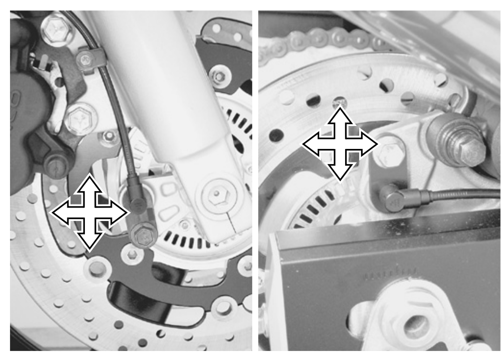
Are the rotors OK?

YES	Go to step 3.
NO	Clean or replace the rotor.

SAMPLE

Step 3

1) Check that the front and rear wheel speed sensors are mounted steadily.

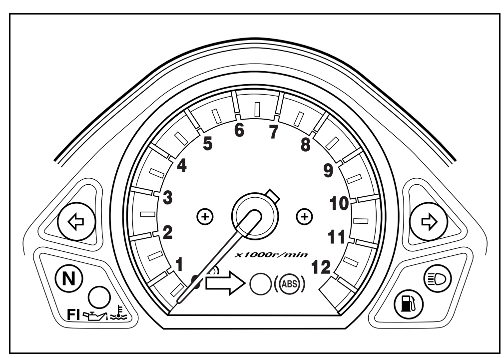


Are the sensors mounted steadily?

YES	Go to step 4.
NO	Tighten the mounting bolts or replace the bracket if necessary.

Step 4

1) Delete DTCs (☞Page 91) and repeat the code output procedure.



If the DTC "55" (C1655) is output again, the ABS control unit/HU should be replaced.

DTC "61" (C1661): ABS SOLENOID MALFUNCTION

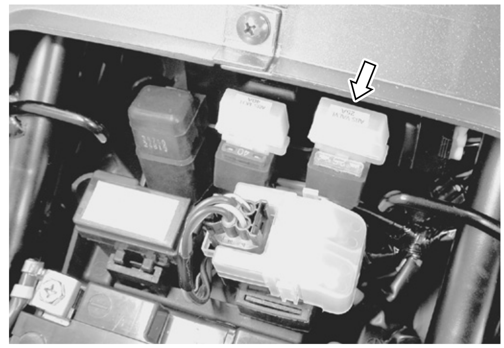
POSSIBLE CAUSE
Valve relay circuit open or short, broken fuse for valve relay, faulty valve relay, interruption of valve, failure output from ABS control unit, etc.

Step 1

1) Turn the ignition switch to OFF.
2) Remove the front seat. (☞SV650/SK3 7-4)
3) Open the fuse box and inspect the ABS valve fuse.

ABS valve fuse: 25 A

Is the ABS valve fuse OK?



YES	Go to step 2.
NO	Replace the ABS valve fuse.

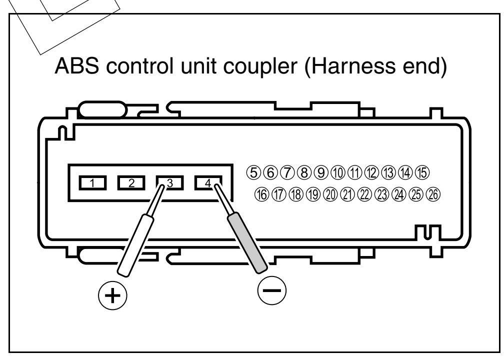
CAUTION

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.

SAMPLE

Step 2

1) Remove the ABS control unit/HU cover. (☞Page 84)
2) Check the ABS control unit coupler for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (☞Page 85)
3) Measure the voltage between ③ terminal and ④ terminal at the coupler.



DATA **Normal value: Battery voltage (12.0 V and more)**

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Voltage (⎓)

Is the voltage between ③ and ④ normal?

YES	Replace the ABS control unit/HU.
NO	Inspect the wire harness. (Faulty valve relay power supply or ground wire)

IRREPARABLE MALFUNCTIONS

Even though the ABS is operating correctly, a DTC is memorized in any of the following conditions.

Conditions
• Spinning wheel is detected. • Previous malfunctions were repaired, but the DTCs were not deleted.

- After carrying out DTC deleting and ABS operation check (☞Page 91), explain to the customer that the ABS is operating correctly.

ABS COMPONENT REMOVAL, INSPECTION AND INSTALLATION
FRONT WHEEL SPEED SENSOR/SENSOR ROTOR
REMOVAL

CAUTION

* **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
* **Do not hit the sensor rotor when dismounting the wheel.**
* **The wheel speed sensor cannot be disassembled.**

- Remove the front wheel speed sensor ① by removing the mounting bolt.
- Remove the front wheel assembly. (☞SV650/SK3 7-9)

⚠ WARNING

Make sure that the motorcycle is supported securely.



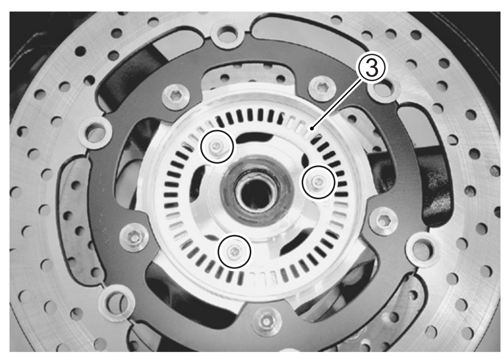
- Remove the front wheel speed sensor bracket ②.



- Remove the front wheel speed sensor rotor ③.

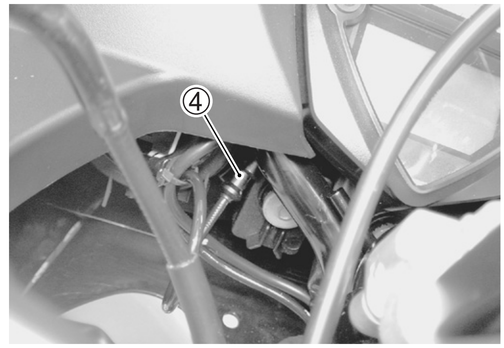
CAUTION

When replacing the tire, make sure not to damage the sensor rotor.



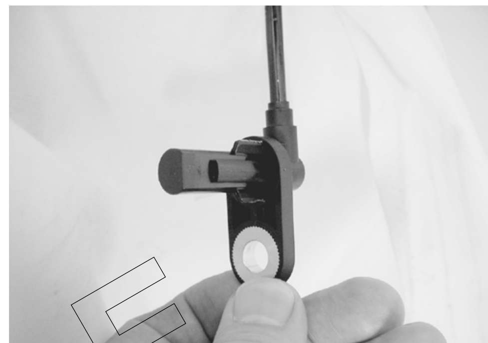
SAMPLE

- Remove the headlight. (SV650A) (☞SV650/SK3 8-37)
- Disconnect the sensor coupler ④ and remove the front wheel speed sensor. (☞Page 142 and 143)

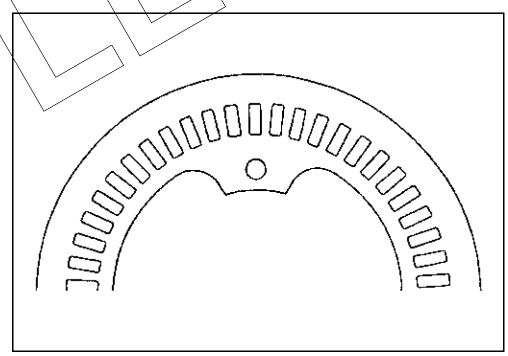


INSPECTION

- Inspect the wheel speed sensor for damage.
- Clean the sensor if any metal particle or foreign material stuck on it.



- Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor.

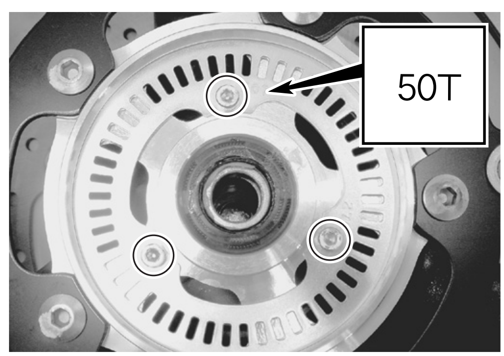


SAMPLE

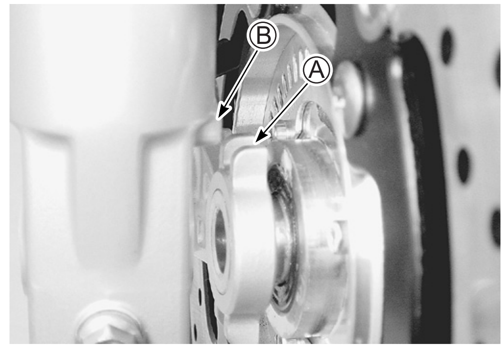
INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters "50T" face outside.



- Install the front wheel assembly. (☞SV650/SK3 7-15)
- Align the recess Ⓐ on the speed sensor bracket with the stopper Ⓑ on the right front fork.



- Check the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge.

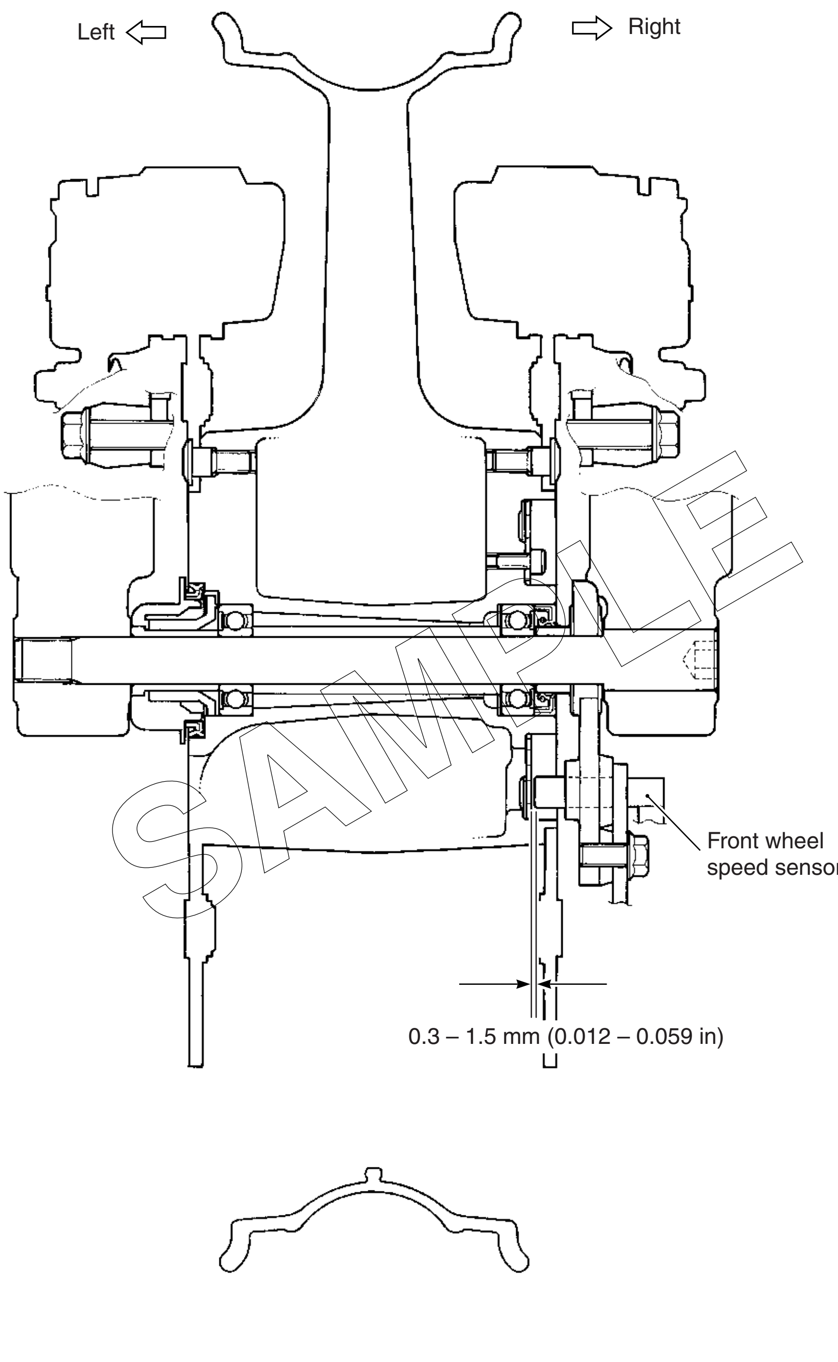
DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge



SAMPLE

FRONT WHEEL SPEED SENSOR INSTALLATION



SAMPLE

REAR WHEEL SPEED SENSOR/SENSOR ROTOR

REMOVAL

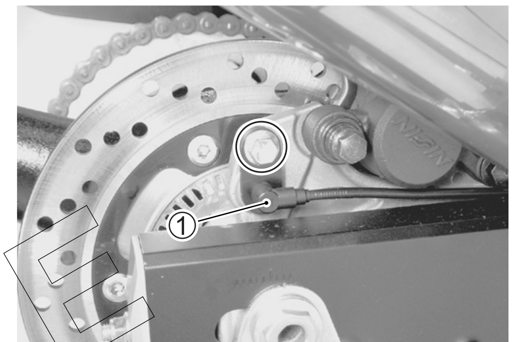
CAUTION

* **The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
* **Do not hit the sensor rotor when dismounting the wheel.**
* **The wheel speed sensor cannot be disassembled.**

- Remove the rear wheel speed sensor ① by removing the mounting bolt.
- Remove the rear wheel assembly. (☞SV650/SK3 7-42)

⚠ WARNING

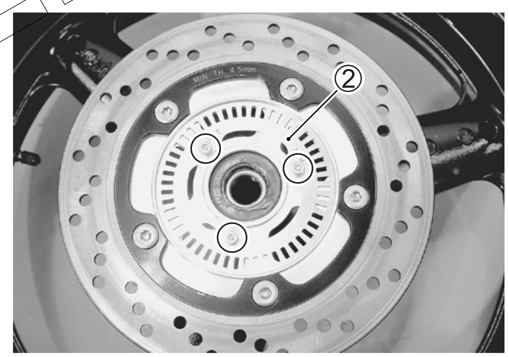
Make sure that the motorcycle is supported securely.



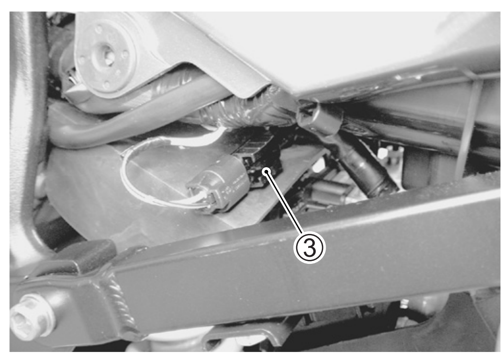
- Remove the rear wheel speed sensor rotor ②.

CAUTION

When replacing the tire, make sure not to damage the sensor rotor.



- Remove the battery case. (☞Page 126)
- Disconnect the sensor coupler ③ and remove the rear wheel speed sensor. (☞Page 144)



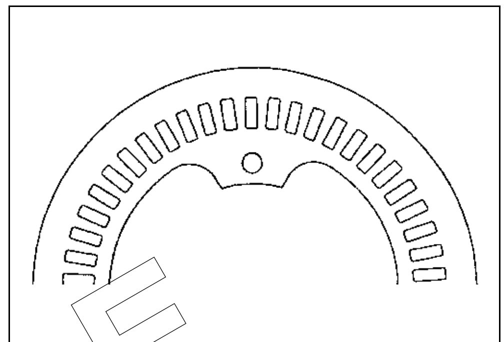
SAMPLE

INSPECTION

- Inspect the wheel speed sensor for damage.
- Clean the sensor if any metal particle or foreign material stuck on it.



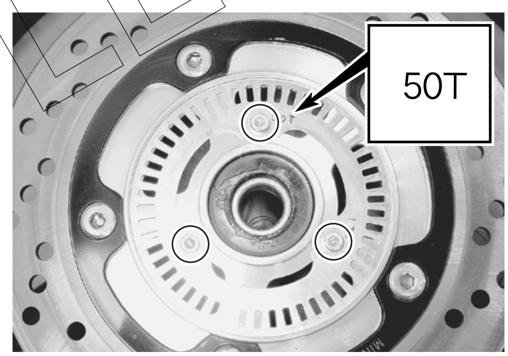
- Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor.



INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters "50T" face outside.

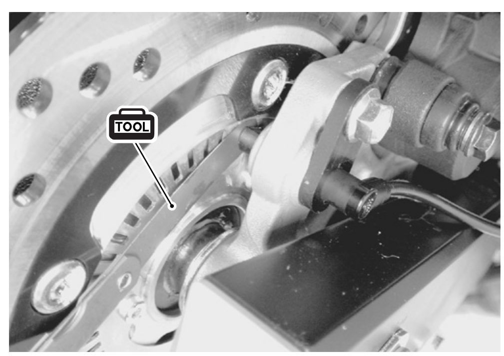


SAMPLE

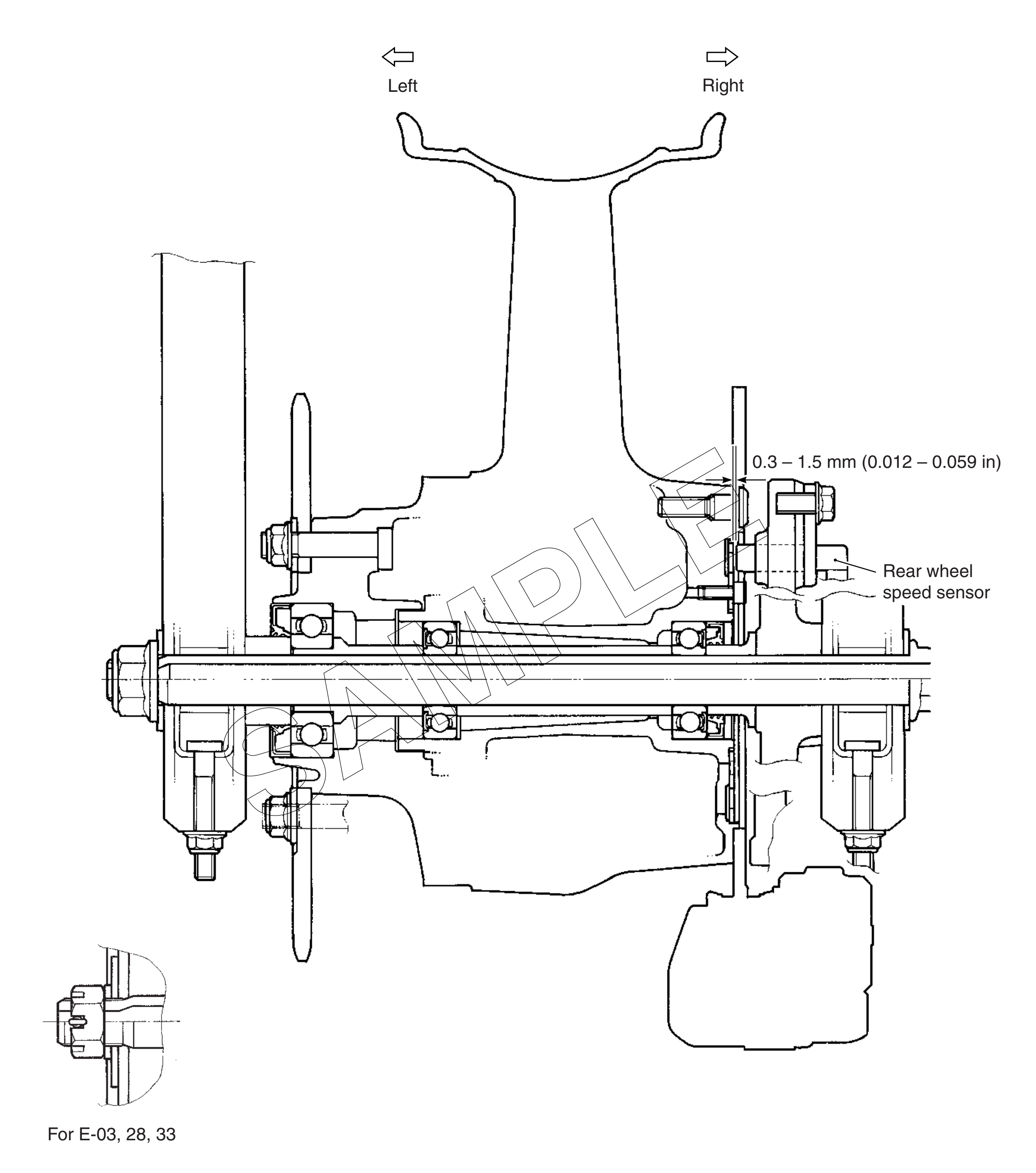
- Check the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge.

DATA **Wheel speed sensor – sensor rotor clearance:**
0.3 – 1.5 mm (0.012 – 0.059 in)

TOOL **09900-20803: Thickness gauge**
09900-20806: Thickness gauge



REAR WHEEL SPEED SENSOR INSTALLATION



ABS CONTROL UNIT/HU

REMOVAL

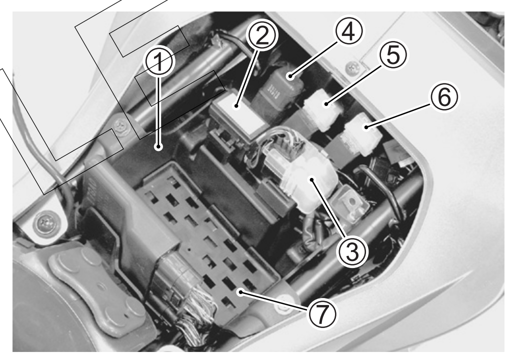
⚠ WARNING

When storing the brake fluid, seal the container completely and keep away from children.

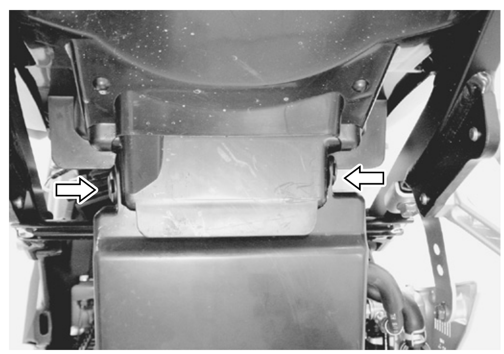
CAUTION

*** This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.**
*** Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.**
*** Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage then severely.**
*** The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.**
*** The ABS control unit/HU cannot be disassembled.**

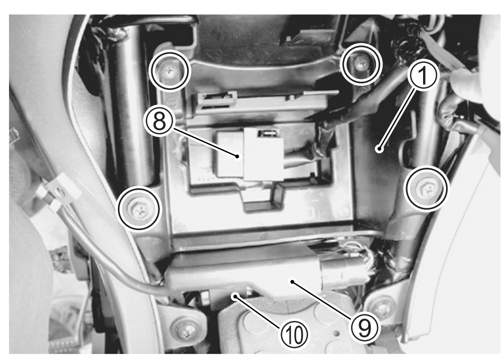
- Remove the front seat. (☞SV650/SK3 7-4)
- Remove the battery.
- Disconnect the following parts from the battery case ①.
  ② Fuse box
  ③ Starter relay
  ④ Fuel pump relay
  ⑤ ABS motor relay fuse
  ⑥ ABS valve relay fuse
  ⑦ Rubber seat



- Remove the fasteners.

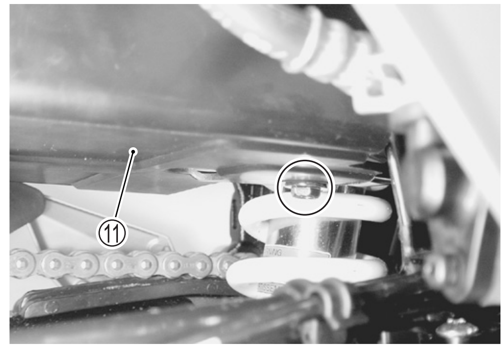


- Disconnect the relay box ⑧, ECM ⑨ and TO sensor ⑩ from the battery case.
- Remove the battery case ①.

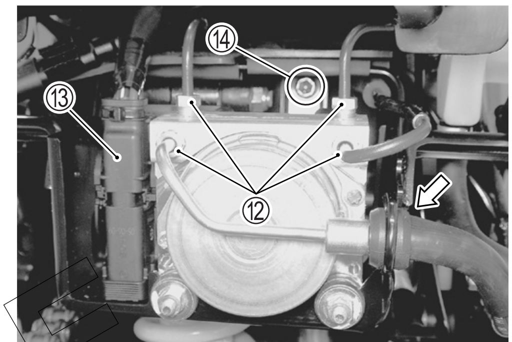


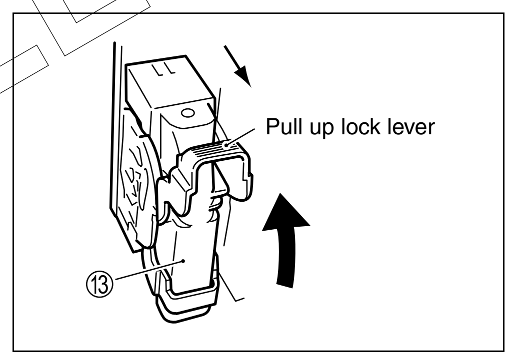
SAMPLE

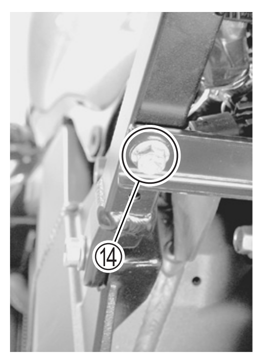
- Remove the ABS control unit/HU cover ⑪.

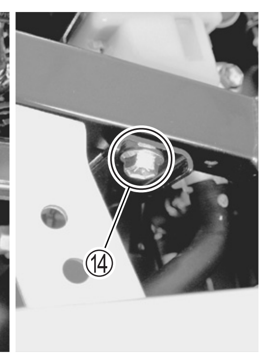


- Drain the brake fluid. (☞SV650/SK3 7-65)
- Loosen the flare nuts ⑫ and disconnect the brake pipes.
- Disconnect the ABS control unit coupler ⑬.
- Remove the ABS control unit/HU by removing the mounting bolts ⑭.







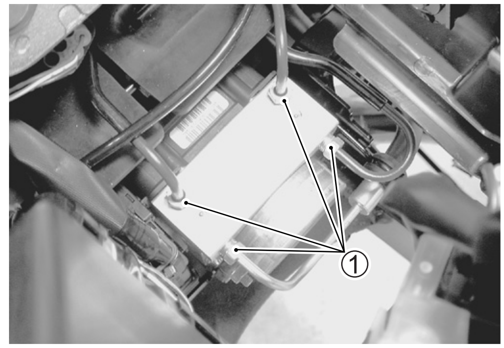


SAMPLE

INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points.

- Tighten the brake pipe flare nuts ① to the specified torque.



Brake pipe flare nut: 16 N·m (1.6 kgf-m, 11.5 lb-ft)

CAUTION

*** Route the brake hoses and pipes correctly.**
(☞Page 135 to 137)
*** Make sure to hold the brake pipe when tightening the flare nut, or it may be misaligned.**

- Bleed air from the brake fluid circuit.
  (☞SV650/SK3 2-27 and -28)

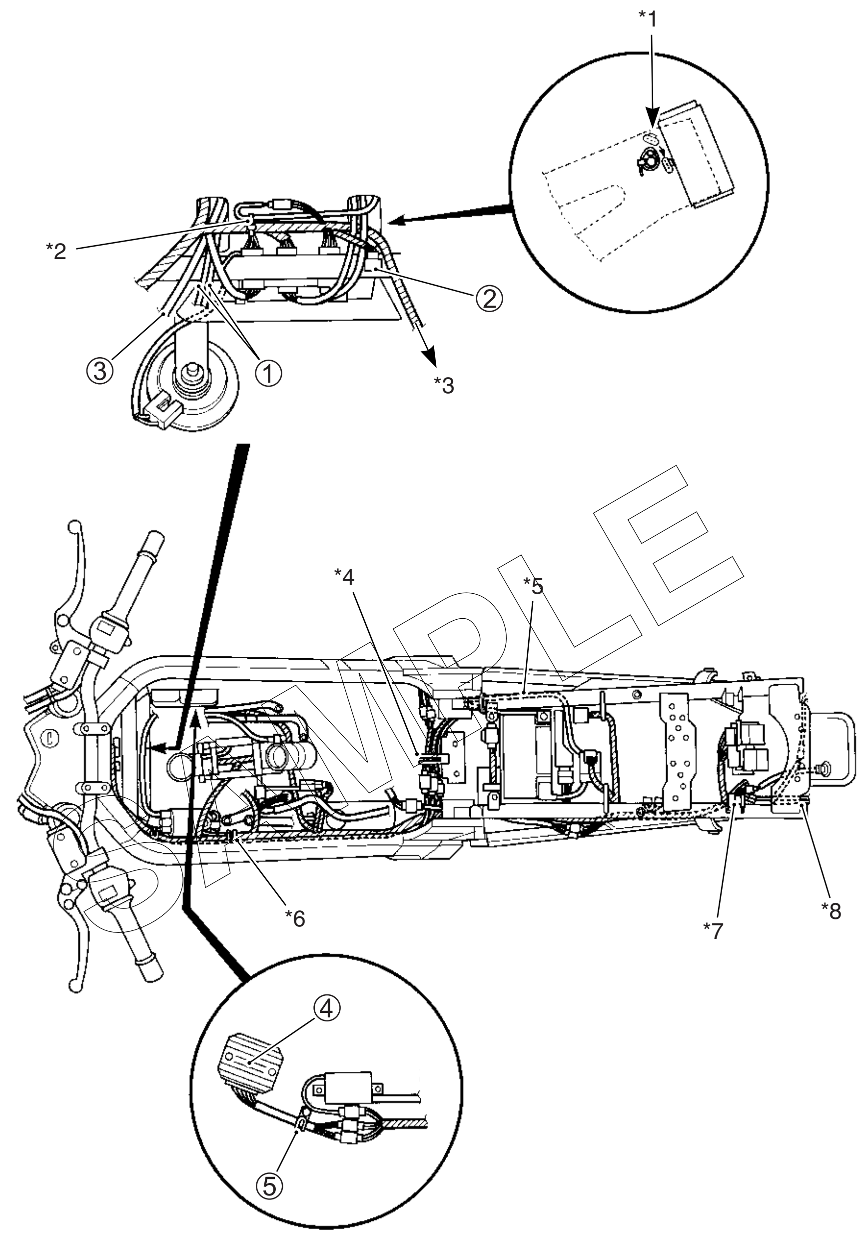
⚠ WARNING

Never ride the motorcycle before bleeding the air.

SAMPLE

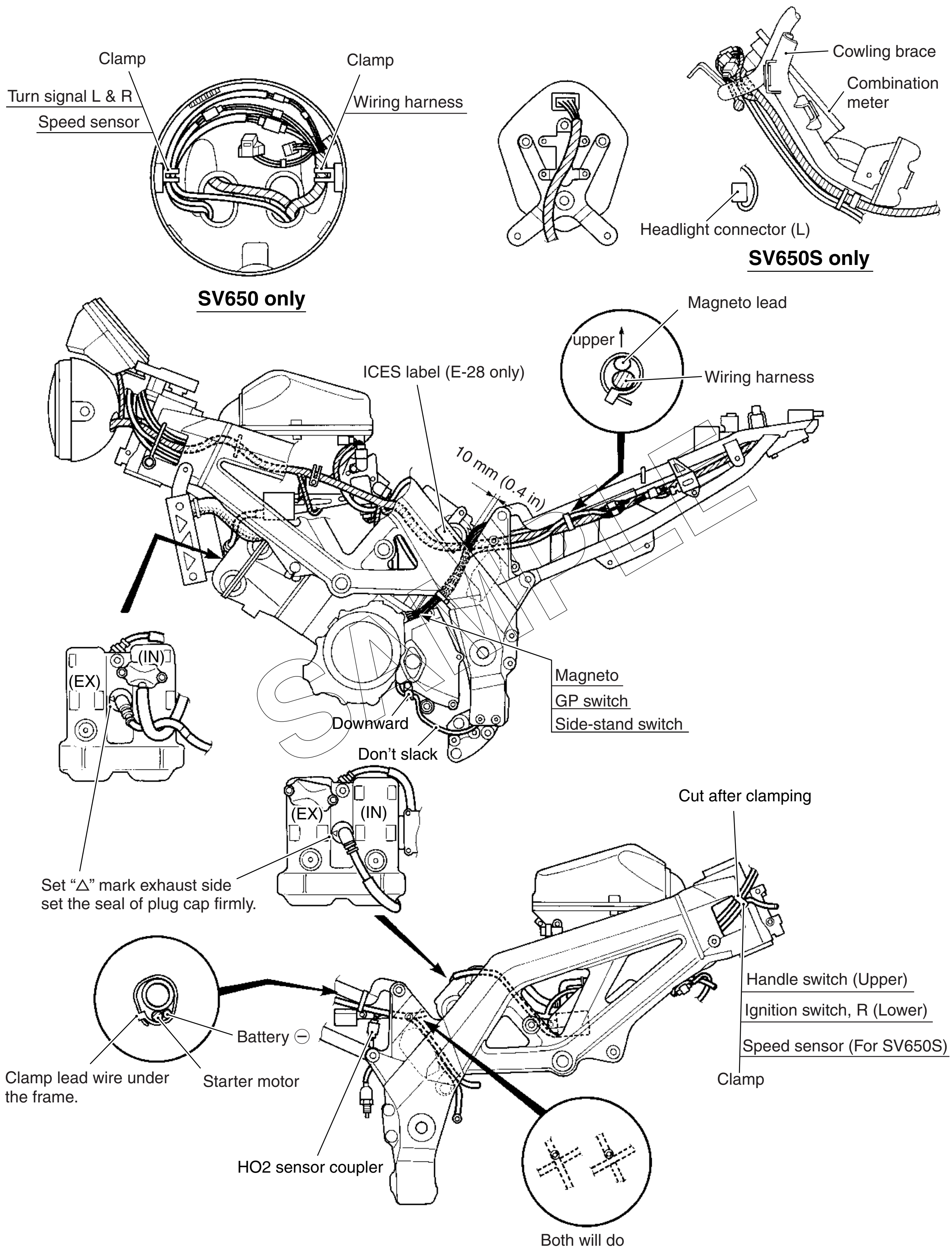
WIRING HARNESS, CABLE, HOSE ROUTING AND SENSOR INSTALLATION

WIRING HARNESS ROUTING (For SV650/S)

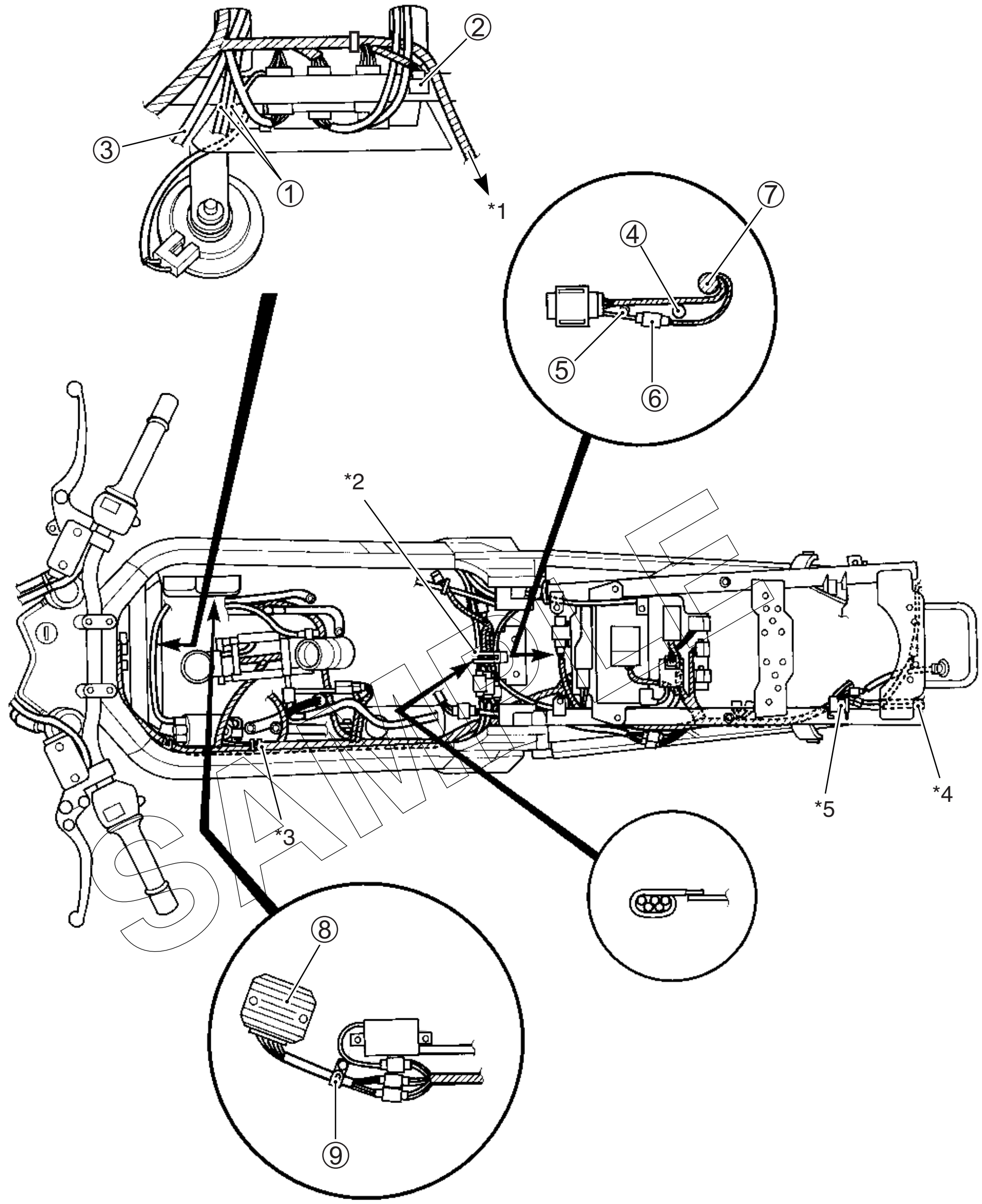


SAMPLE

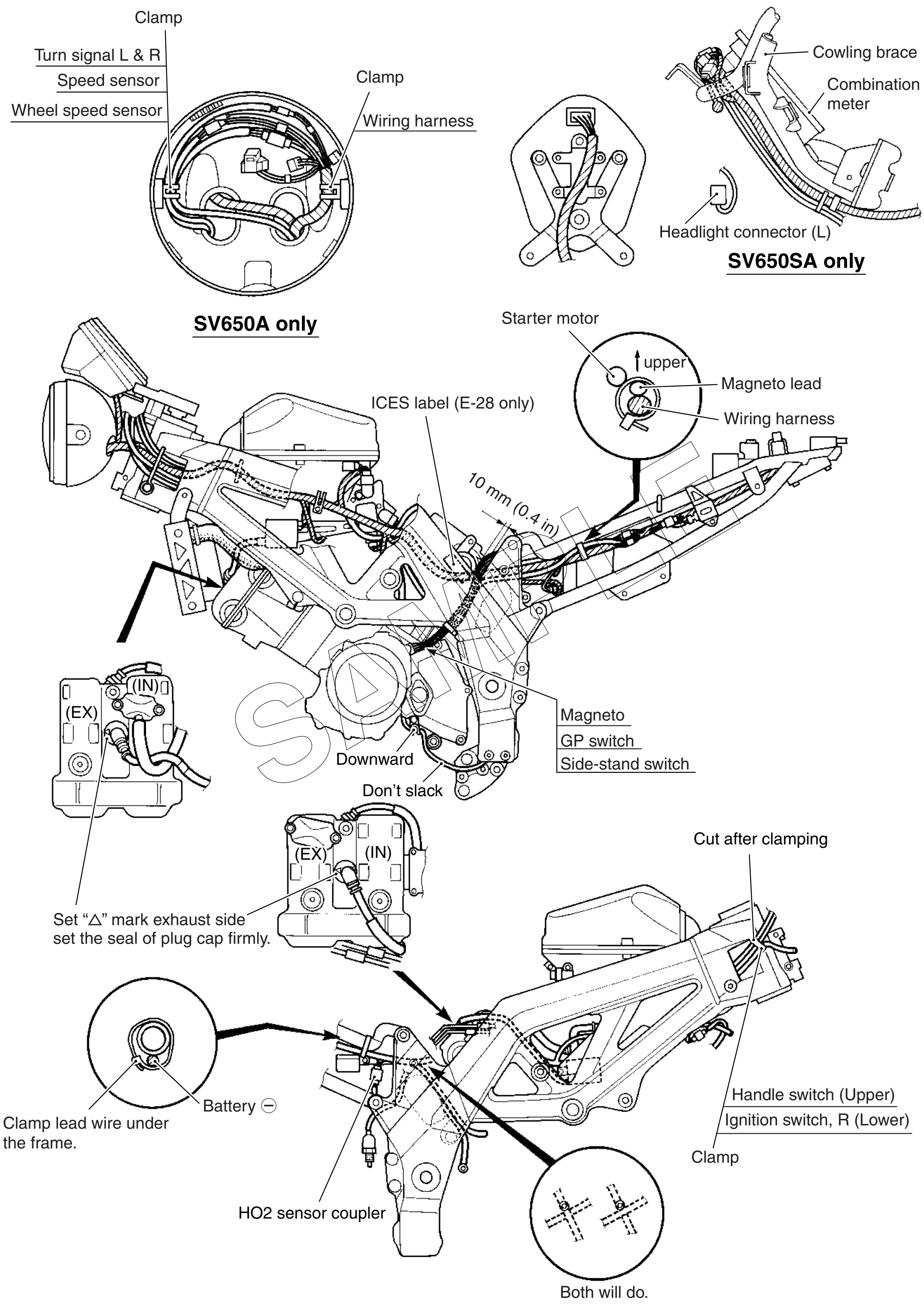
①	Throttle cable	*3	To fan motor.
②	ISC valve coupler	*4	Clamp harness without contact to bracket.
③	Clutch cable	*5	Be careful for the lead wire not to be slackened.
④	Rectifier	*6	Base for assembling (White tape) TPS branch wire : Set upward
⑤	Clamp	*7	Set coupler inside triangle area between frame and fender.
*1	Push down speed sensor coupler to between frame and wiring harness. (For SV650S)	*8	Set rear turn and licence lamp leads pulled to upside of rear fender.
*2	Clamp the speed sensor wiring harness. (For SV650S)		


Clamp
Turn signal L & R
Speed sensor
Clamp
Wiring harness
SV650 only
Cowling brace
Combination meter
Headlight connector (L)
SV650S only
Magneto lead
upper
Wiring harness
ICES label (E-28 only)
10 mm (0.4 in)
(IN)
(EX)
Magneto
GP switch
Side-stand switch
Downward
Don't slack
(EX)
(IN)
Set "△" mark exhaust side
set the seal of plug cap firmly.
Cut after clamping
Handle switch (Upper)
Ignition switch, R (Lower)
Speed sensor (For SV650S)
Clamp
Battery ⊖
Clamp lead wire under
the frame.
Starter motor
HO2 sensor coupler
Both will do

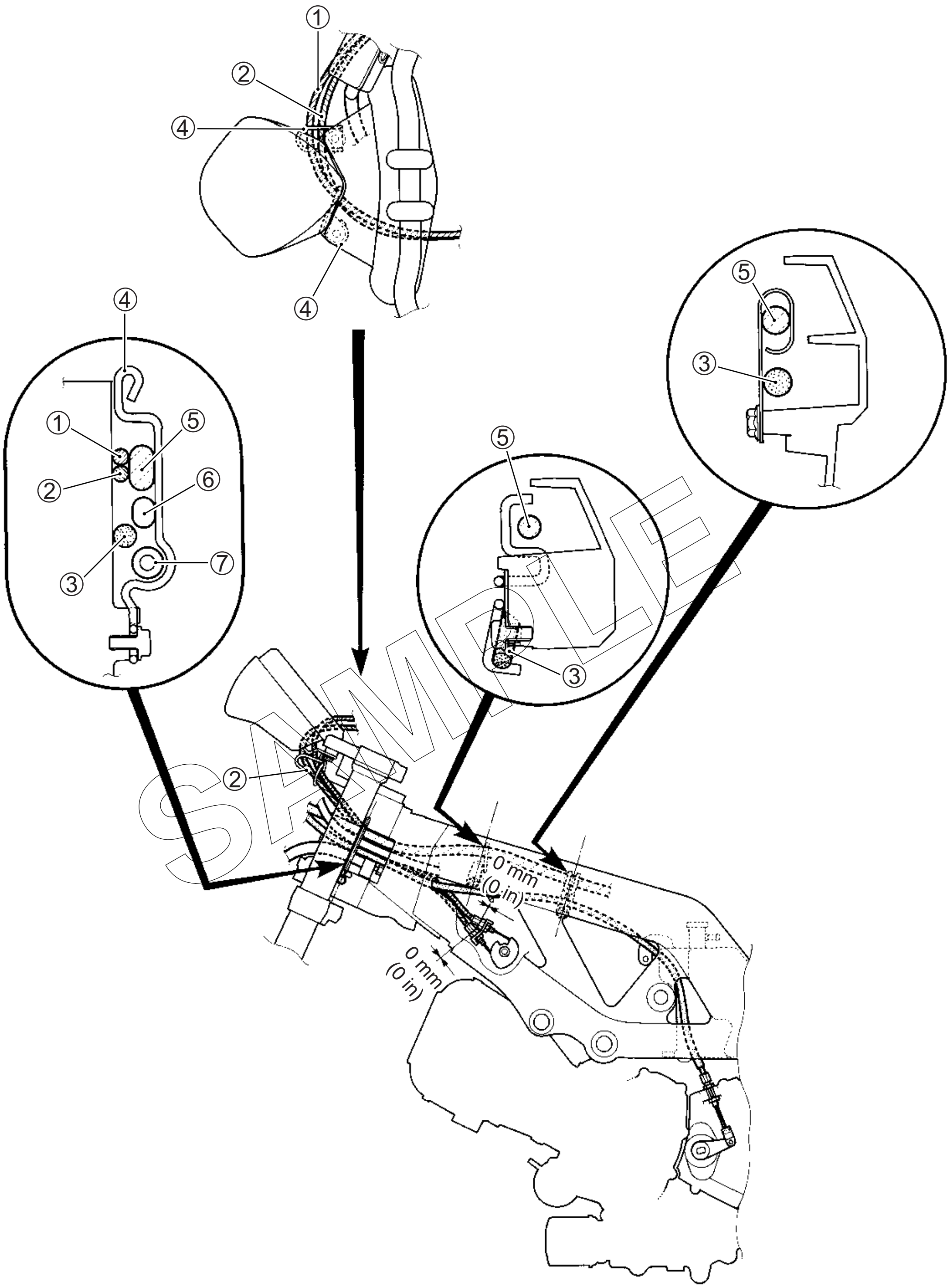
WIRE HARNESS ROUTING (For SV650A/SA)



①	Throttle cable	⑧	Rectifier
②	ISC valve coupler	⑨	Clamp
③	Clutch cable	*1	To fan motor
④	ABS control unit	*2	Clamp harness without contact to bracket.
⑤	Brake pipe (ABS)	*3	Base for assembling (White tape) TPS branch wire : Set upward
⑥	Wheel speed sensor	*4	Set rear turn and licence lamp leads pulled to upside of rear fender.
⑦	Wiring harness	*5	Set coupler inside triangle area between frame and fender.

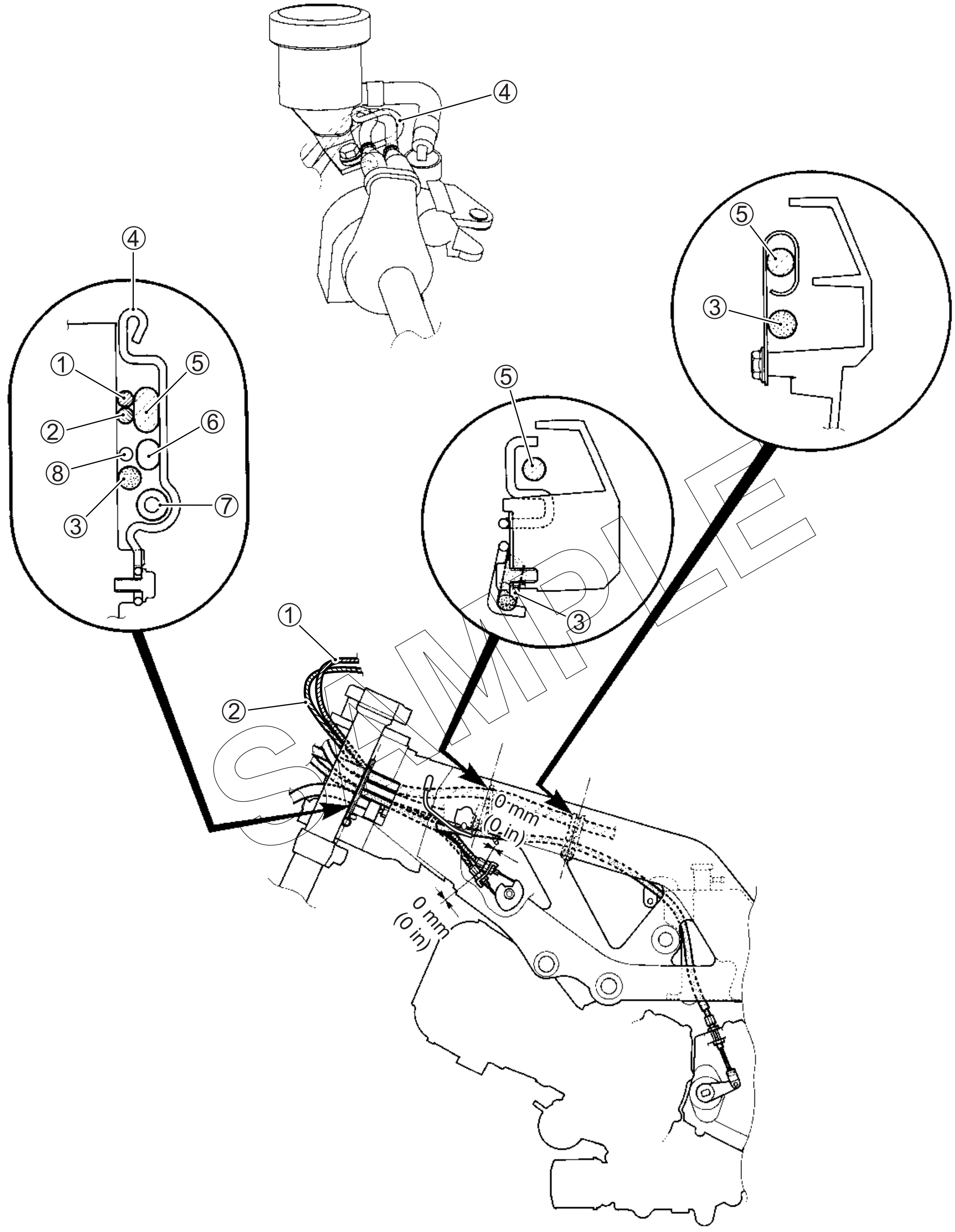

Clamp
Turn signal L & R
Speed sensor
Wheel speed sensor
Clamp
Wiring harness
SV650A only
Cowling brace
Combination meter
Headlight connector (L)
SV650SA only
Starter motor
upper
Magneto lead
Wiring harness
ICES label (E-28 only)
10 mm (0.4 in)
(IN)
(EX)
Magneto
GP switch
Side-stand switch
Downward
Don't slack
(EX)
(IN)
Cut after clamping
Set "△" mark exhaust side
set the seal of plug cap firmly.
Battery ⊖
Clamp lead wire under
the frame.
Handle switch (Upper)
Ignition switch, R (Lower)
Clamp
HO2 sensor coupler
Both will do.

CABLE ROUTING (For SV650/A)



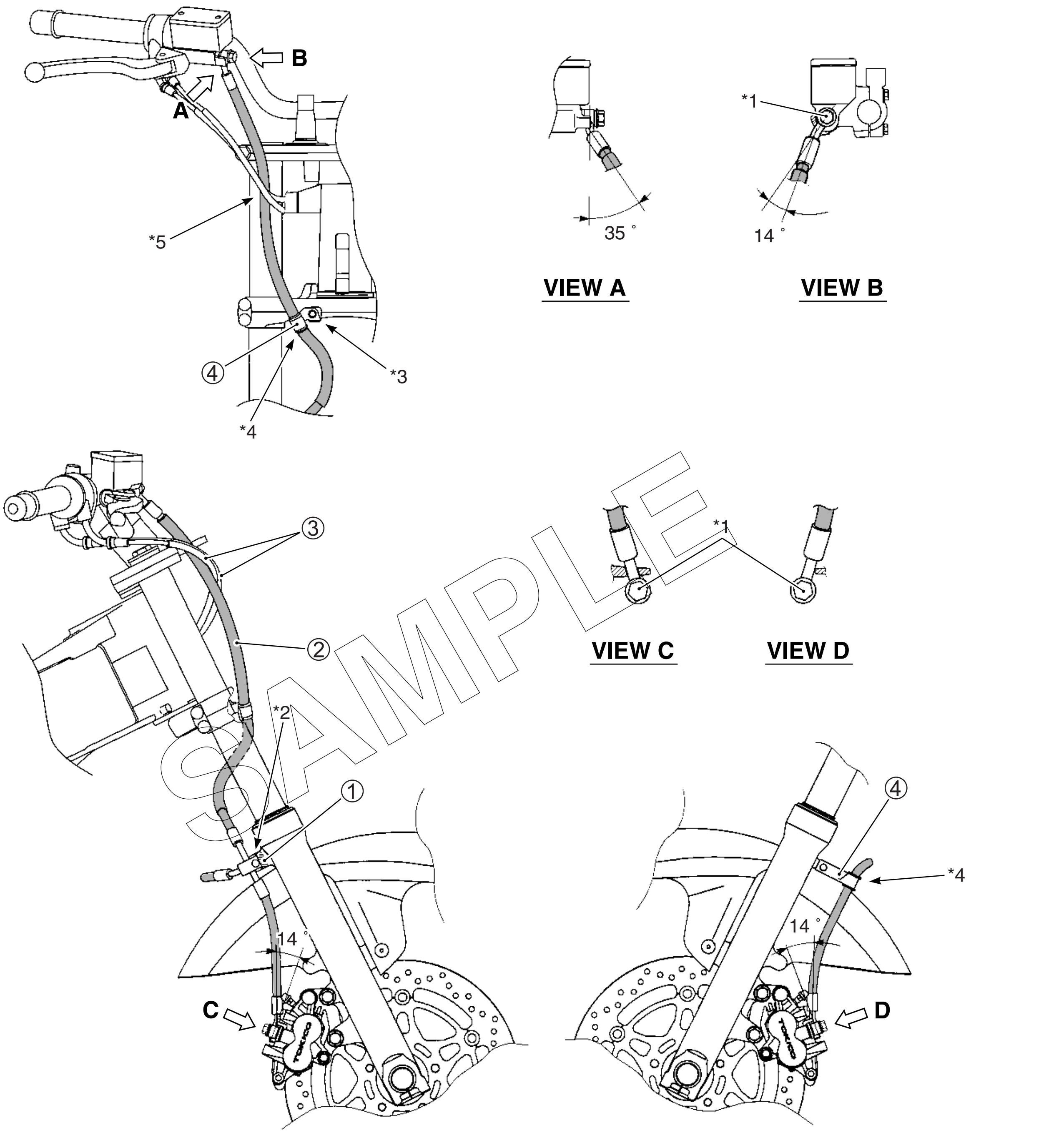
①	Throttle cable No.1	⑤	Wiring harness
②	Throttle cable No.2	⑥	Handle switch (L)
③	Clutch cable	⑦	Brake hose (For SV650A)
④	Guide		

CABLE ROUTING (For SV650S/SA)



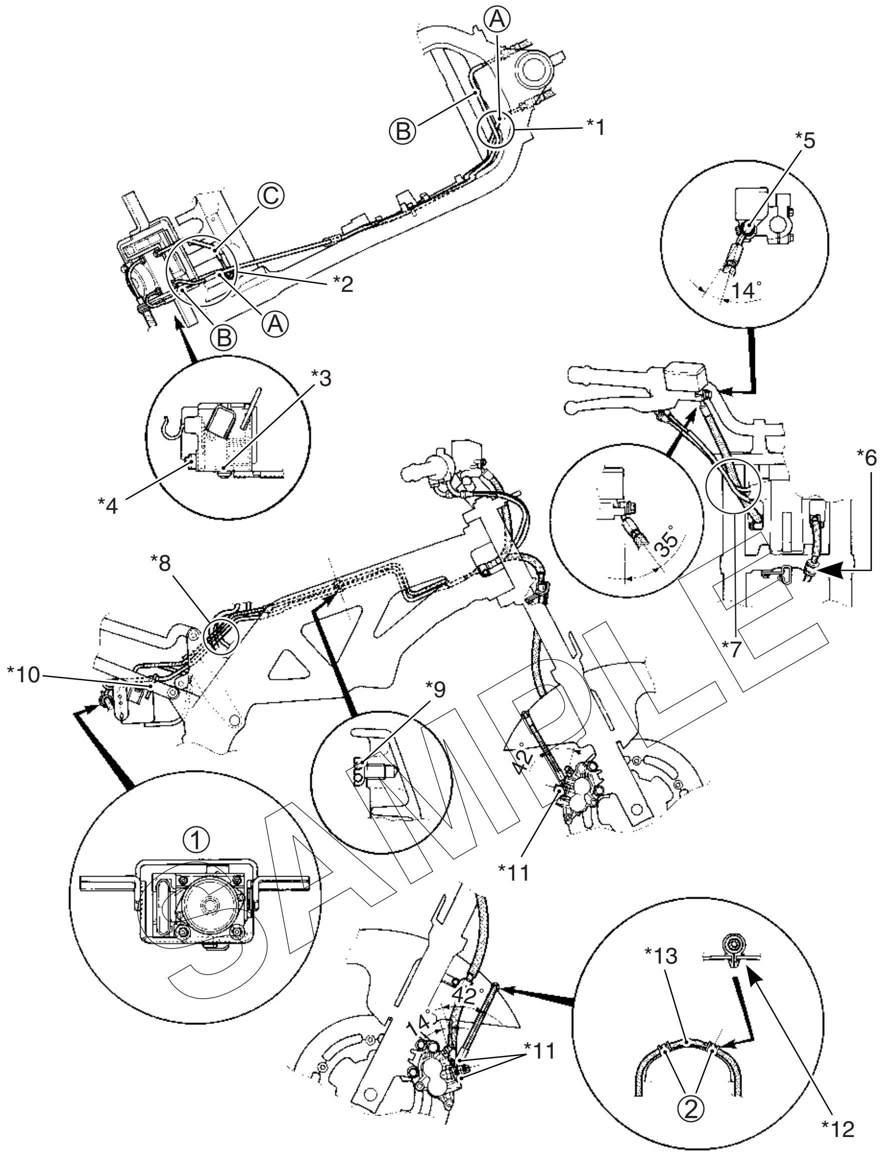
①	Throttle cable No.1	⑤	Wiring harness
②	Throttle cable No.2	⑥	Handle switch (L)
③	Clutch cable	⑦	Brake hose (For SV650SA)
④	Guide	⑧	Speed sensor (For SV650S)

FRONT BRAKE HOSE ROUTING (For SV650)



①	Stopper	*2	After positioning the brake hose junction with the stopper, tighten the bolt.
②	Front brake hose	*3	After positioning the clamp with the stopper, tighten the clamp bolt.
③	Throttle cables	*4	Clamp the brake hose firmly.
④	Brake hose clamp	*5	Pass through the brake hose inside of the throttle cables.
*1	After the brake hose union has contacted the stopper, tighten the union bolt.		

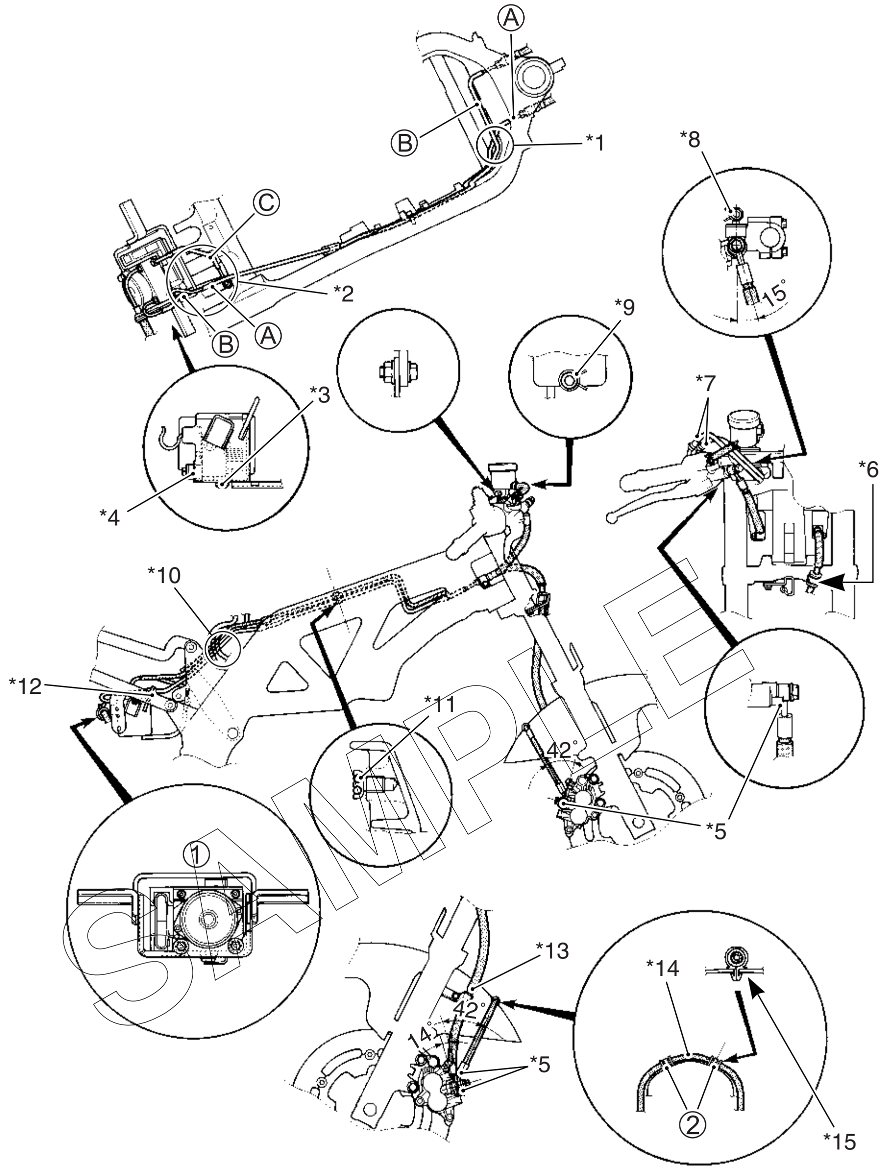
FRONT BRAKE HOSE ROUTING (For SV650A)



SAMPLE

①	ABS control unit/HU	*7	Pass through the throttle cables in front of the brake hose.
②	Clamp	*8	Pass through the brake pipes inside of the fuel tank drain hose and breather hose.
*1	Pass through the brake hose Ⓐ under the Ⓑ.	*9	Fix the pipes painted mark to the clamp.
*2	Pass through the brake hose Ⓐ upper the Ⓑ & Ⓒ.	*10	Set the protector of brake pipe to under the holder guide.
*3	Set the rubber stepped part on the holder's bottom plate.	*11	Set the brake hose with stopper before tightening.
*4	Set the rubber stepped part on the groove of the holder and screw it.	*12	Fit the clamp around the sleeve, insert the clamp to hole of fender.
*5	Set the brake hose with stopper before tightening.	*13	Fix the brake hose painted green to the left and bottom sides.
*6	Clamp the brake hose firmly.		

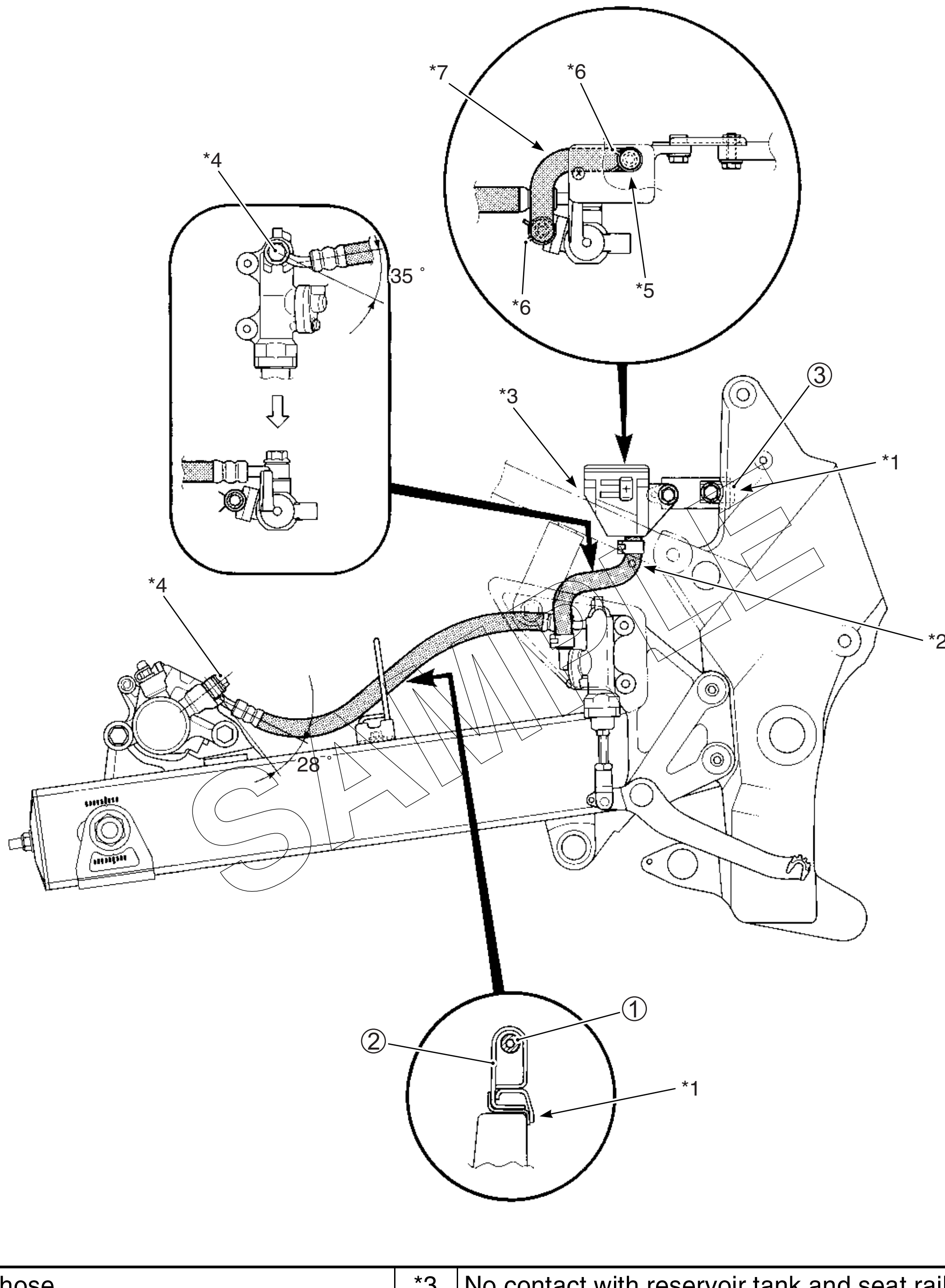
FRONT BRAKE HOSE ROUTING (For SV650SA)



SAMPLE

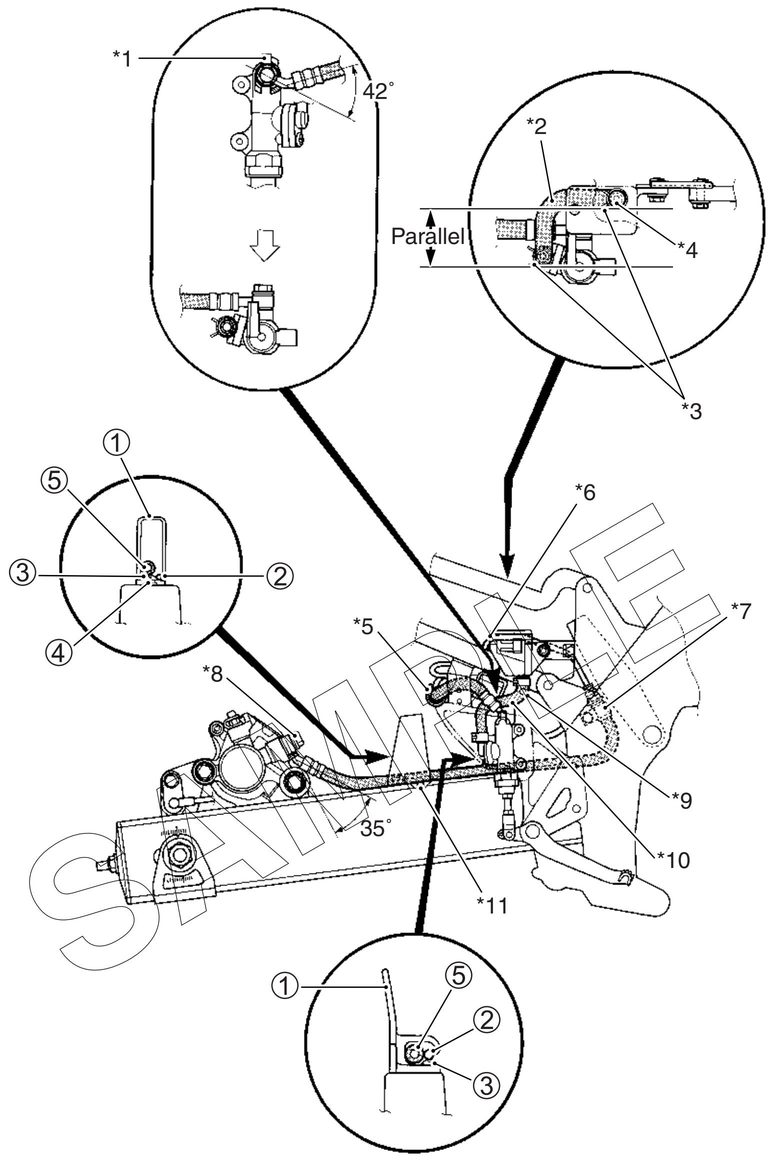
①	ABS control unit/HU	*8	Clamp ends should face backward.
②	Clamp	*9	Clamp ends should face forward.
*1	Pass through the brake hose Ⓐ under the Ⓑ.	*10	Pass through the brake pipes inside of the fuel tank drain hose and breather hose.
*2	Pass through the brake hose Ⓐ upper the Ⓑ & Ⓒ.	*11	Fix the pipes painted mark to the clamp.
*3	Set the rubber stepped part on the holder's bottom plate.	*12	Set the protector of brake pipe to under the holder guide.
*4	Set the rubber stepped part on the groove of the holder and screw it.	*13	Clamp the brake hose firmly.
*5	Set the brake hose with stopper before tightening.	*14	Fix the brake hose painted green to the left and bottom sides.
*6	Clamp the brake hose firmly.	*15	Fit the clamp around the sleeve insert the clamp to hole of fender.
*7	Pass through the throttle cables behind of reservoir hose.		

REAR BRAKE HOSE ROUTING (For SV650/S)



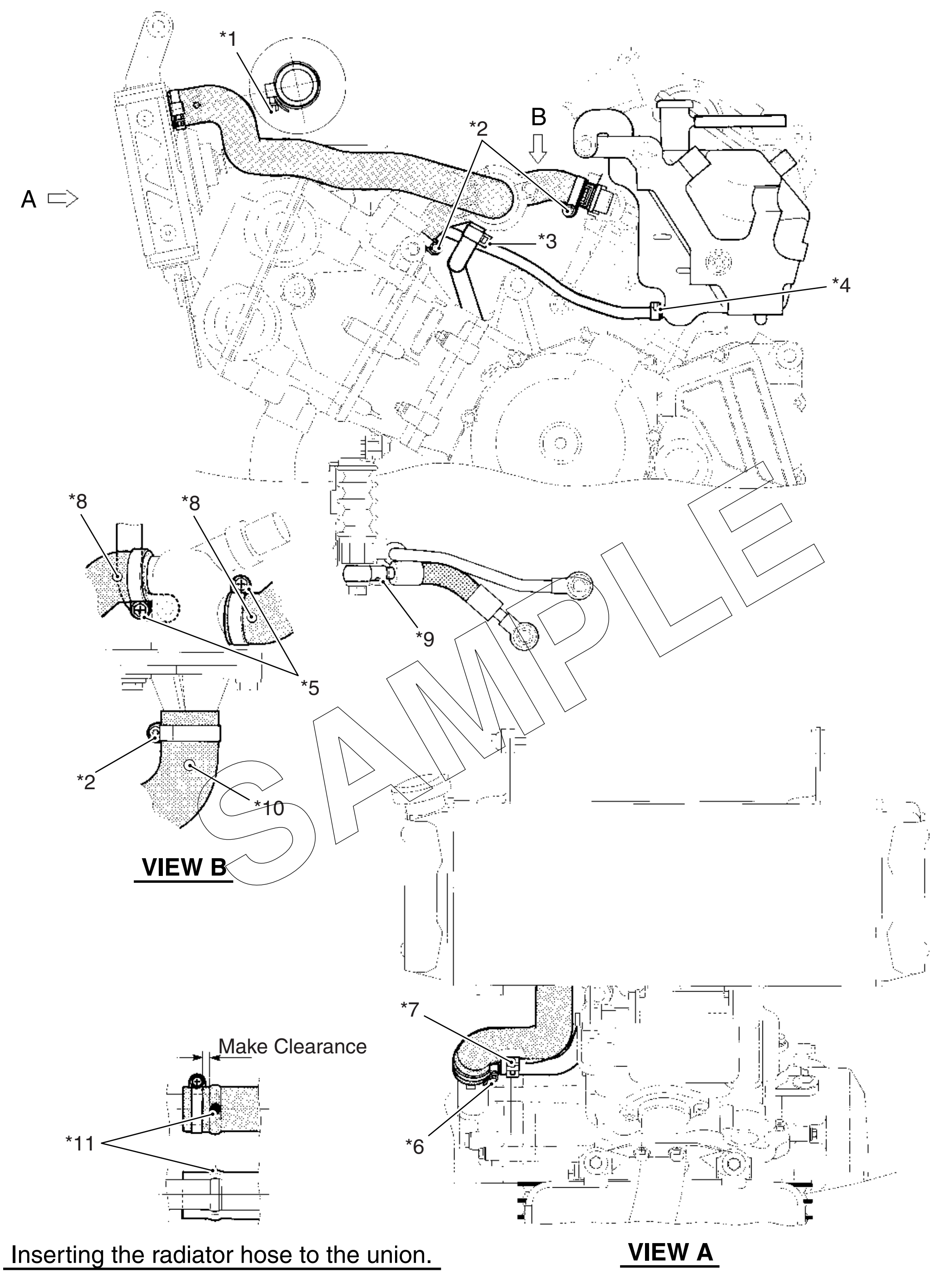
①	Brake hose	*3	No contact with reservoir tank and seat rail.
②	Brake hose guide	*4	After the brake hose union has contacted the stopper, tighten the union bolt.
③	Stopper	*5	White paint
*1	After positioning the bracket with the stopper, tighten the bolt.	*6	Clamp ends should face backward.
*2	White paint should face outside.	*7	Assemble reservoir tank hose as shown.

REAR BRAKE HOSE ROUTING (For SV650A/SA)

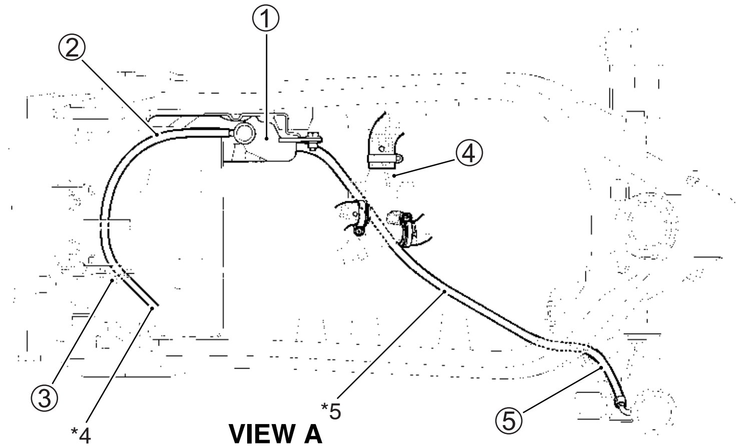


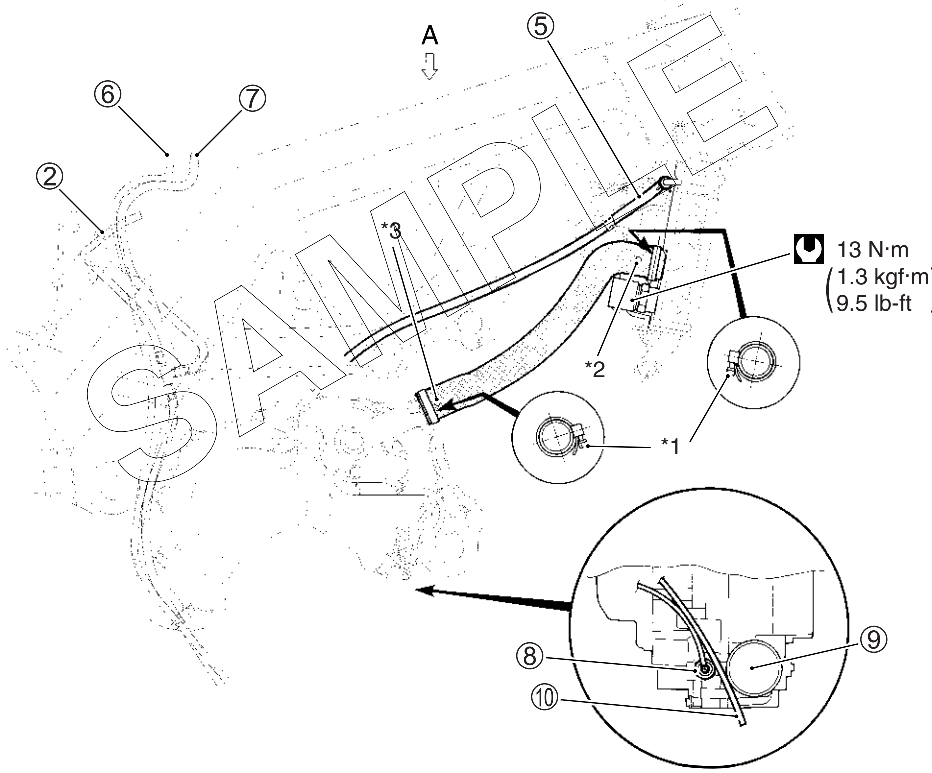
①	Guide	*4	White paint
②	Wheel speed sensor lead	*5	Clamp sleeve of brake hose to guide.
③	Screw	*6	No contact with reservoir tank and seat rail.
④	Washer	*7	Clamp sleeve of brake hose.
⑤	Brake hose	*8	After the brake hose union has contacted the stopper, tighten the union bolt.
*1	After the brake hose union has contacted the stopper, tighten the union bolt.	*9	White paint should face outside.
*2	Assemble reservoir tank hose as shown.	*10	Insert the reservoir hose into union to the root.
*3	Clamp ends should face backward.	*11	Set the guide with hole of swingarm before tightening.

COOLING SYSTEM HOSE ROUTING



*1	Clamp bolt head must face downward.	*7	Clamp ends should face forward.
*2	Clamp bolt head must face left side.	*8	Marking mark (White)
*3	Clamp ends should face downward.	*9	Matching mark (Yellow)
*4	Clamp ends should face upward.	*10	Matching mark (White)
*5	Clamp bolt must face upward.	*11	Matching mark
*6	Clamp bolt head must face forward.		

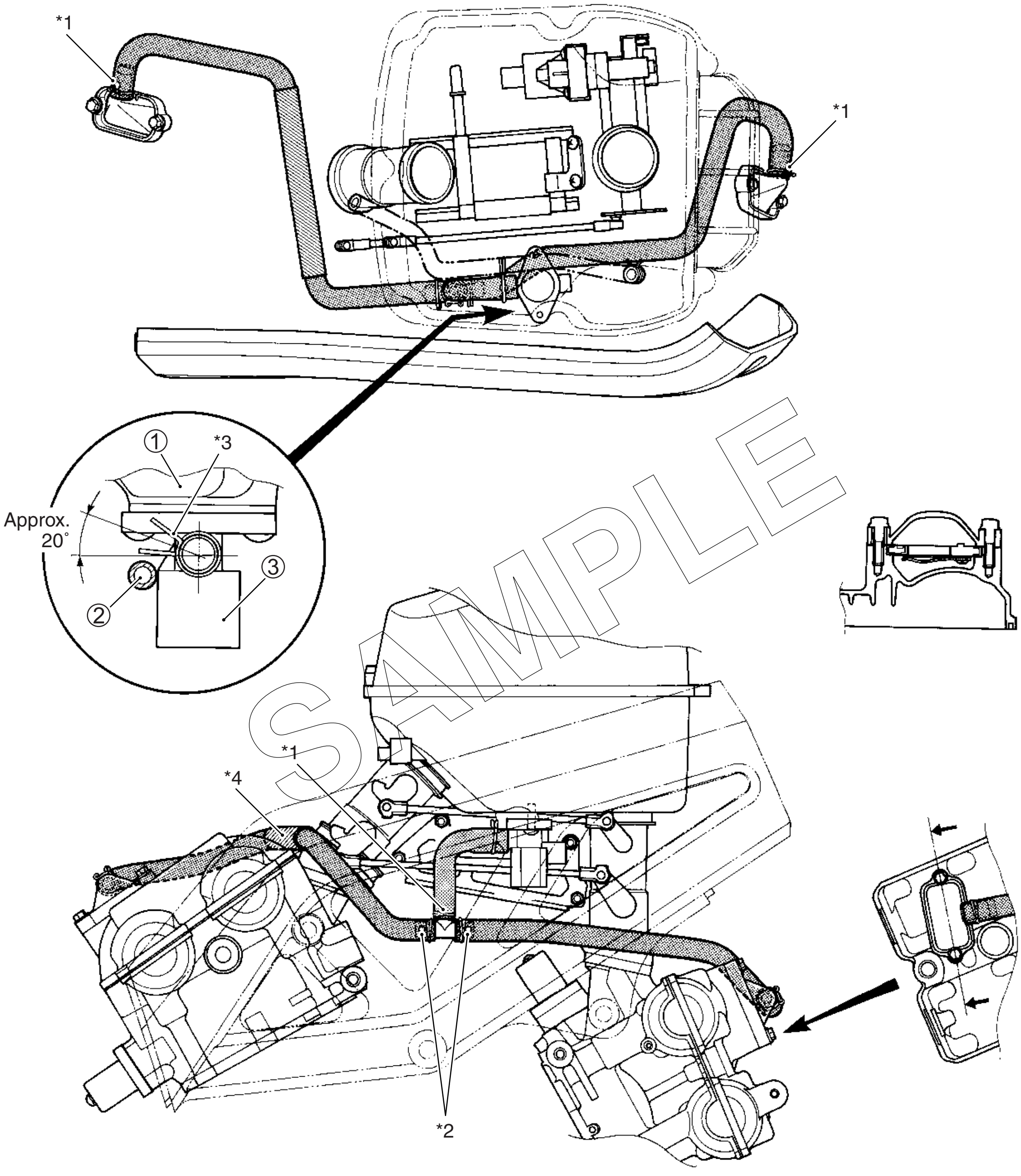




SAMPLE

①	Reservoir tank	⑨	Oil filter
②	Reservoir tank over flow hose	⑩	Water pump drain hose
③	Fuel tank breather hose	*1	The clamp bolt head must face downward.
④	Thermostat	*2	Matching mark (Yellow)
⑤	Reservoir tank inlet hose	*3	Matching mark (White)
⑥	Fuel tank breather hose	*4	Pass through the reservoir tank over flow hose under the fuel tank breather valve.
⑦	Fuel tank water drain hose	*5	Pass through the reservoir tank inlet hose under the thermostat and over the bypass valve.
⑧	Oil pressure switch		

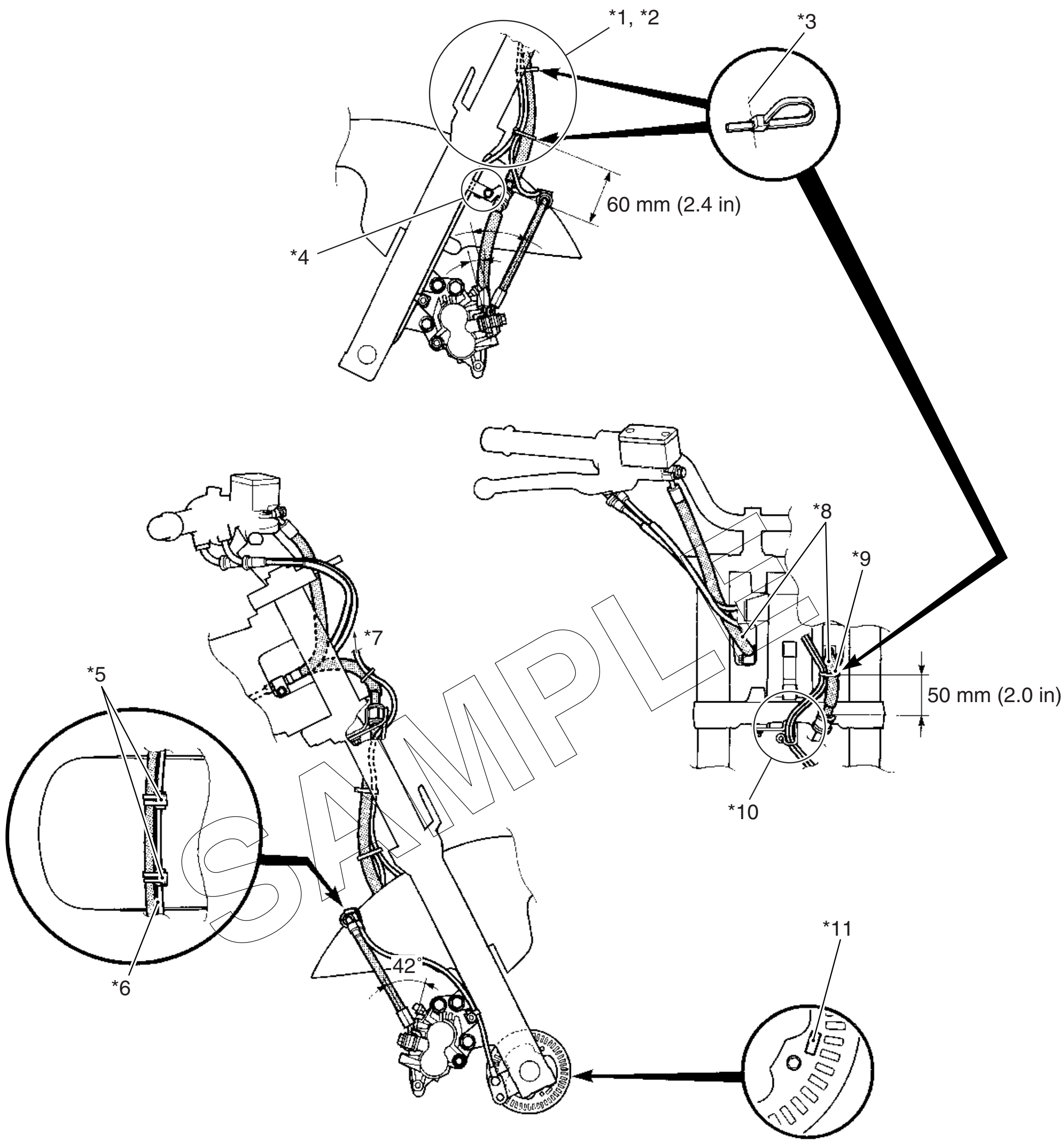
PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



SAMPLE

①	Air cleaner	*2	Matching mark (Yellow)
②	Fuel hose	*3	Be careful not to touch the air cleaner and fuel hose.
③	PAIR valve	*4	Pass through the hose between head cover and intake pipe.
*1	Matching mark (White)		

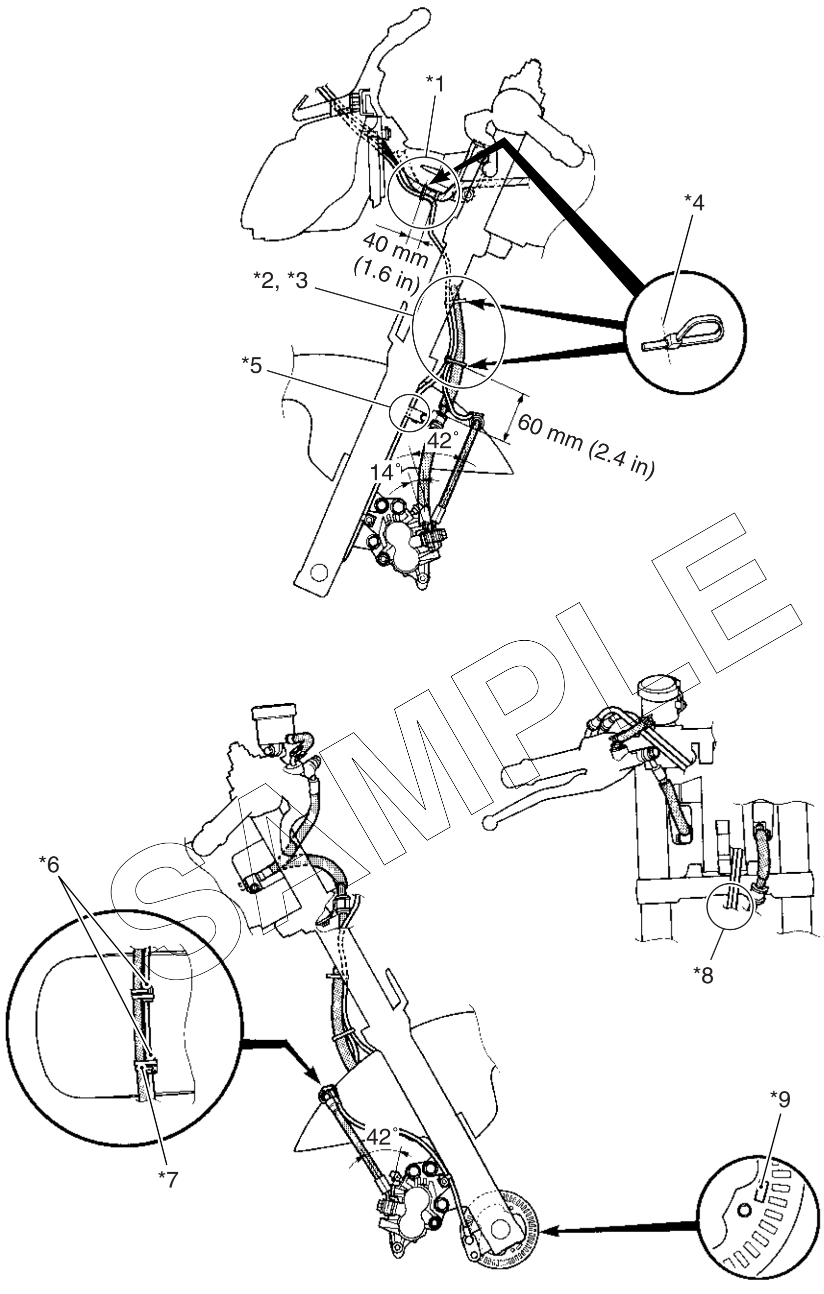
FRONT WHEEL SPEED SENSOR INSTALLATION (For SV650A)



SAMPLE

*1	Pass the wheel speed sensor lead wire and speed sensor lead wire in front of the brake hose.	*7	Into headlight housing
*2	Clamp the sensor lead wire to brake hose with speed sensor lead wire at yellow marking.	*8	Clamp brake hose to the head pipe and into the frame.
*3	Cut excess tip.	*9	Clamp the sensor lead wire to brake hose with speed sensor lead wire at yellow marking.
*4	Set speed sensor lead wire between front fork and clamp.	*10	Pass through the sensor lead wire and the speed sensor lead wire to the guide, no contact with sensor lead wires and frame.
*5	Clamp the sensor lead wire to brake hose at sleeve.	*11	Letters should face outward.
*6	Clamp at front side of brake hose. Make clearance with the front fender. Clamp the sensor lead wire to brake hose.		

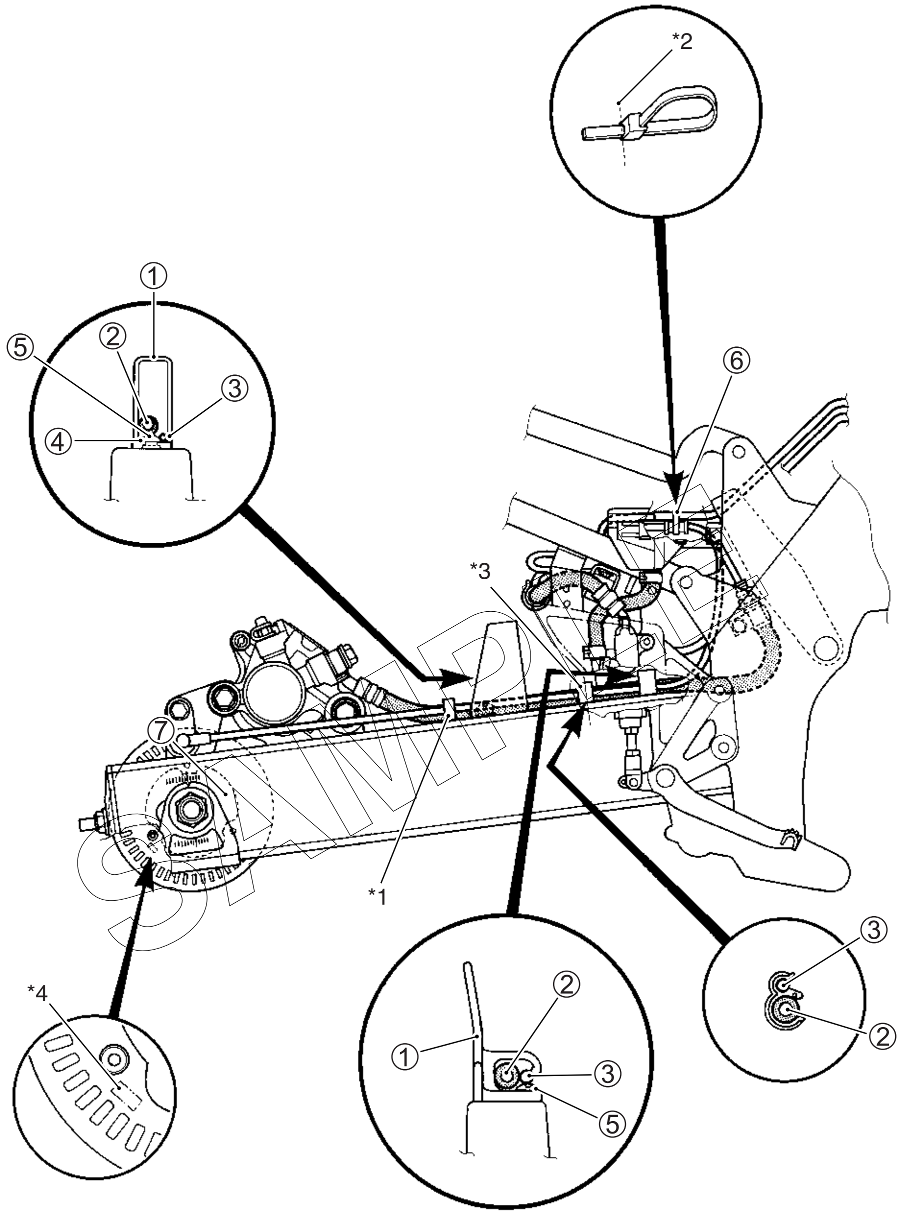
FRONT WHEEL SPEED SENSOR INSTALLATION (For SV650SA)



SAMPLE

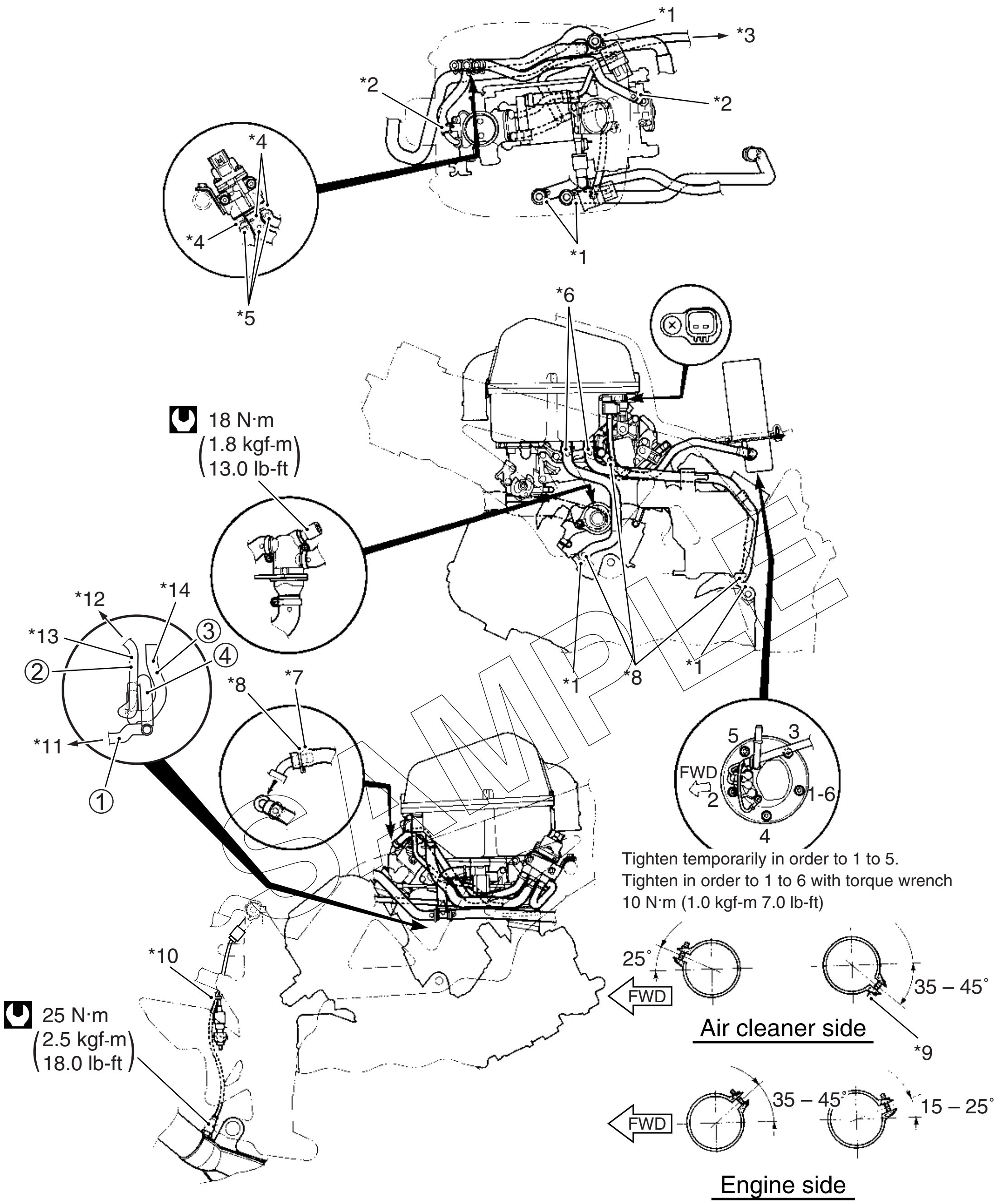
*1	Clamp the sensor lead wire to wiring harness with speed sensor lead wire at yellow marking.	*6	Clamp the sensor lead wire to brake hose at sleeve.
*2	Pass the wheel speed sensor lead wire and speed sensor lead wire in front of the brake hose.	*7	Clamp at front side of brake hose. Make clearance with the front fender. Clamp the sensor lead wire to brake hose.
*3	Clamp the sensor lead wire to brake hose with speed sensor lead wire at yellow marking.	*8	No contact with sensor lead wires and frame.
*4	Cut excess tip.	*9	Letters should face outward.
*5	Set speed sensor lead wire between front fork and clamp.		

REAR WHEEL SPEED SENSOR INSTALLATION (For SV650A/SA)



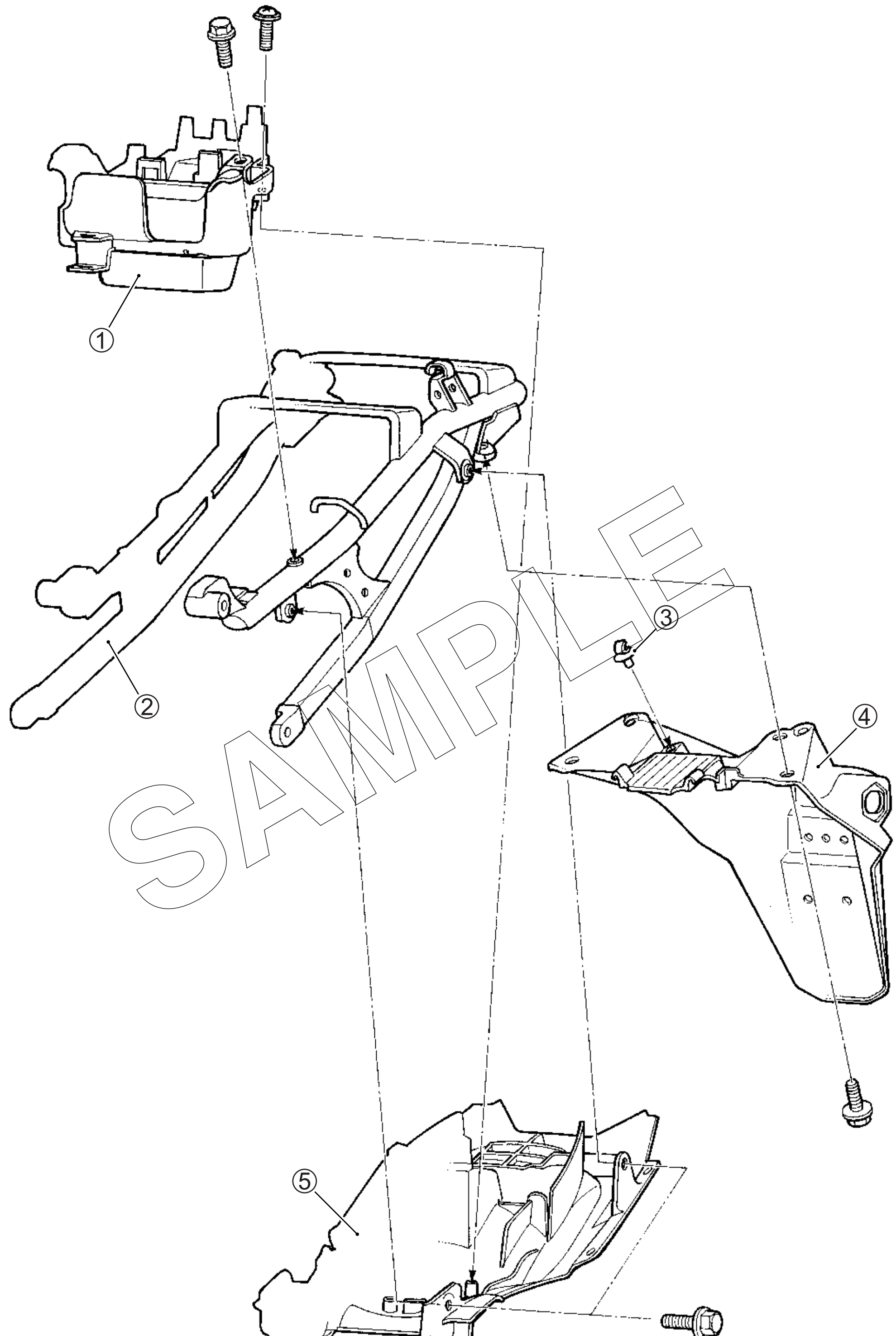
①	Guide	⑦	Wheel speed sensor
②	Brake hose	*1	Check the clearance between clamp and swin-garm.
③	Wheel speed sensor lead wire	*2	Cut excess tip.
④	Washer	*3	Clamp the sensor lead wire at white painted line.
⑤	Screw	*4	Letters should face outward.
⑥	Clamp		

THROTTLE BODY INSTALLATION



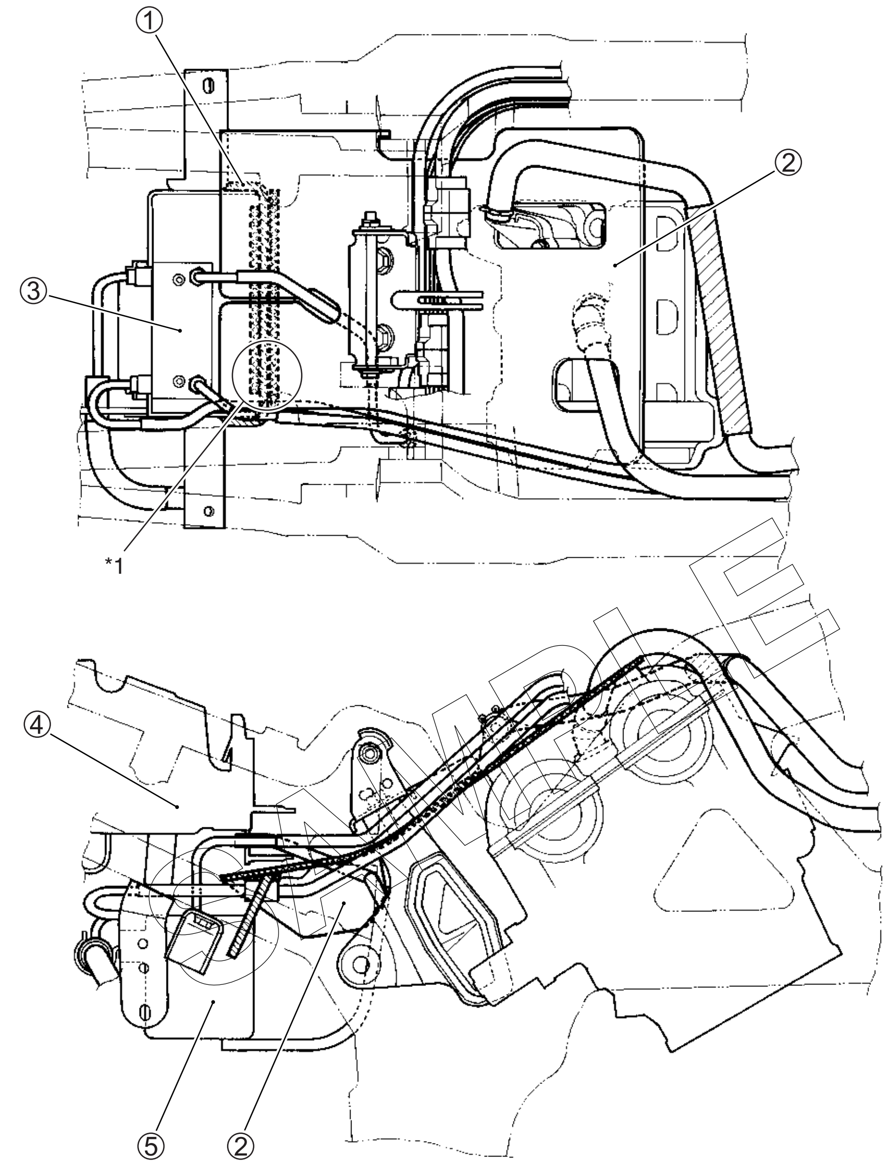
①	PAIR valve hose (F)	*7	Matching mark (White)
②	ISC valve hose (R)	*8	Match mark to bulge of nipple.
③	ISC valve hose	*9	Be careful not touch the throttle body.
④	PAIR valve hose	*10	Cut after clamping.
*1	Clamp ends should face back side.	*11	To cylinder head cover (F)
*2	Clamp ends should face lower side.	*12	To throttle body
*3	To canister purge hose (Only for E-33)	*13	Pass through the ISC valve hose (R) upper side of PAIR valve hose (F) and left side of PAIR valve hose.
*4	Clamp ends should face left side.		
*5	Matching mark (Blue)	*14	Pass through the ISC valve hose upper side of PAIR valve hose (F) and right side of PAIR valve hose.
*6	Matching mark (Yellow)		

REAR FENDER INSTALLATION



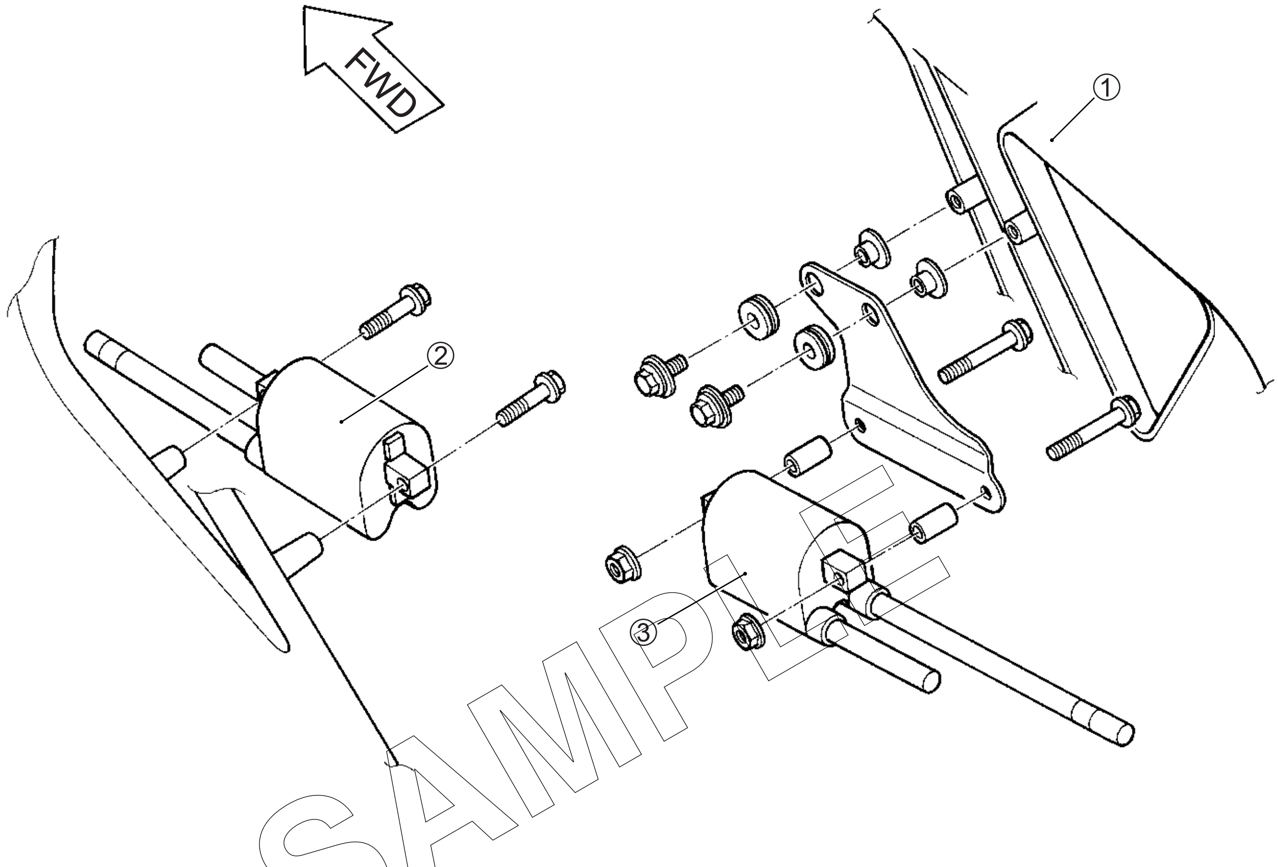
①	Battery holder	④	Rear rear fender
②	Seat rail	⑤	Front rear fender
③	Clamp		

HEAT SHIELD INSTALLATION



①	Sheet bracket	④	Battery holder
②	Heat shield rubber sheet	⑤	ABS control unit/HU holder
③	ABS control unit/HU	*1	Set both side to rear fender front firmly.

IGNITION COIL INSTALLATION

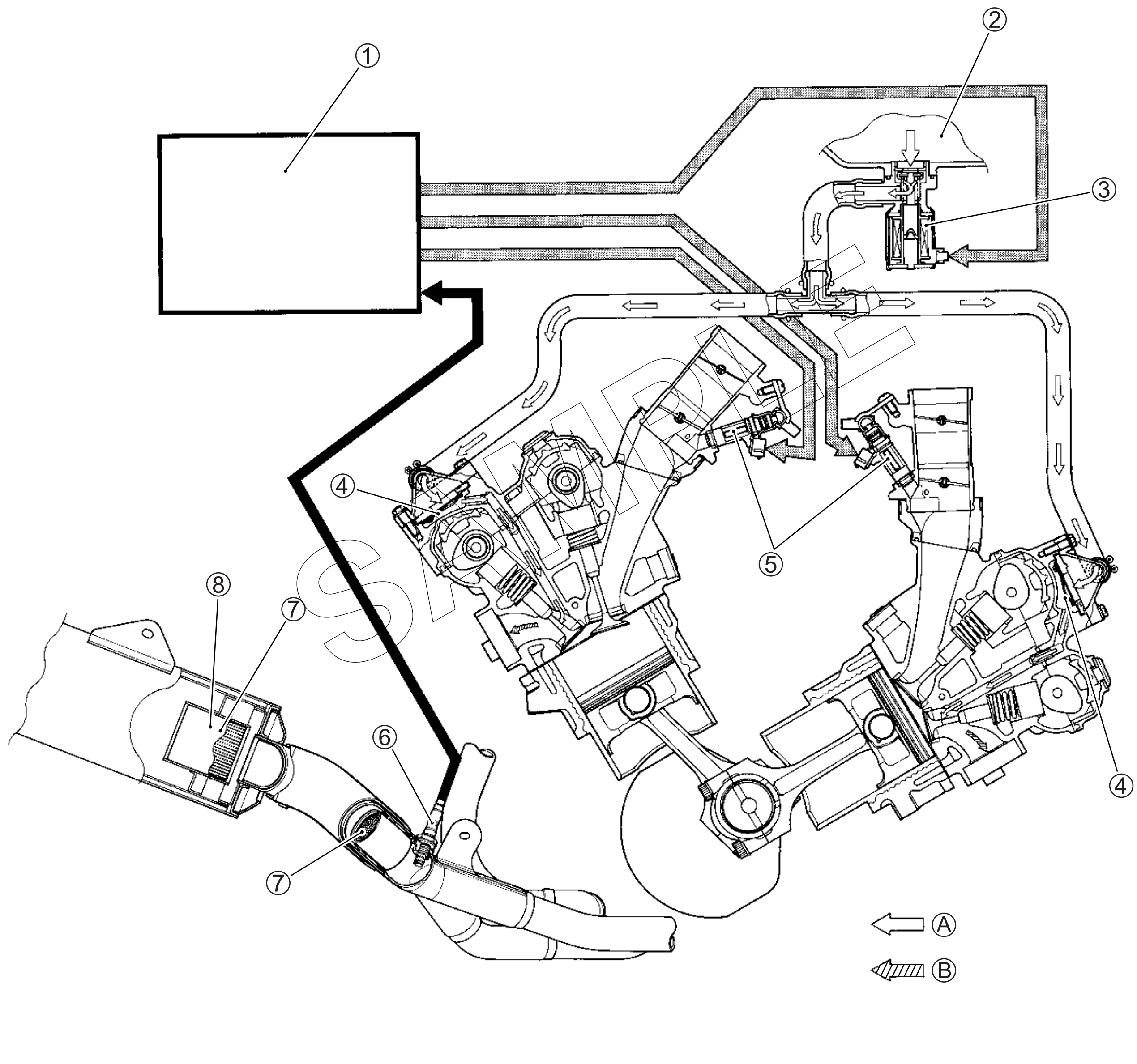


SAMPLE

①	Frame	②	Front ignition coil	③	Rear ignition coil

EMISSION CONTROL SYSTEM
EXHAUST EMISSION CONTROL SYSTEM (PAIR SYSTEM)

The exhaust emission control system is composed of the PAIR system and CATALYST system. The fresh air is drawn into the exhaust port with the PAIR solenoid valve and PAIR reed valve. The PAIR solenoid valve is operated by the ECM, and the fresh air flow is controlled according to the TPS, ECTS, IATS, IAPS and CKPS.



①	ECM	⑥	HO2 sensor (E-02, 19, 24, 33)
②	Air cleaner box	⑦	Catalyst (E-02, 19, 24, 33)
③	PAIR control solenoid valve	⑧	Catalyst (E-03, 33)
④	PAIR reed valve	Ⓐ	FRESH AIR
⑤	Fuel injector	Ⓑ	EXHAUST GAS

PAIR (AIR SUPPLY) SYSTEM INSPECTION

HOSES

☞SV650/SK3 10-6

PAIR REED VALVE

☞SV650/SK3 10-6

PAIR CONTROL SOLENOID VALVE

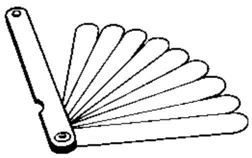
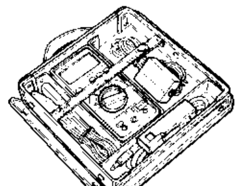
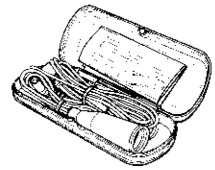
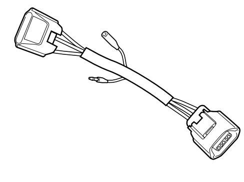
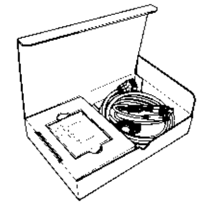
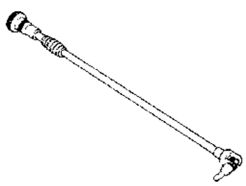
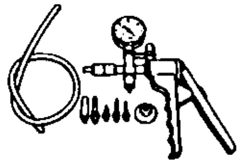
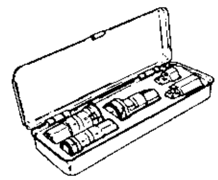
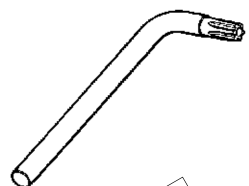
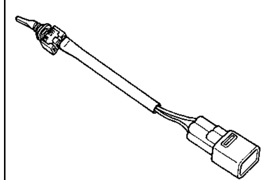
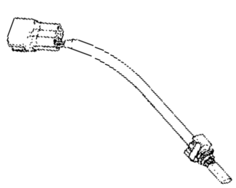
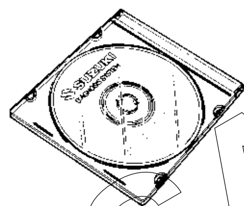
☞Page 48

HEATED OXYGEN SENSOR (HO2S) INSPECTION (For E-02, 19, 24, 33)

☞Page 44

SAMPLE

SPECIAL TOOLS

 09900-20803 09900-20806 Thickness gauge	 09900-25008 Multi-circuit tester set	 09900-25009 Needle pointed probe set	 09900-28630 TPS test wire harness	 09904-41010 SDS set tool
 09913-10130 Carburetor adjuster driver	 09917-47011 Vacuum pump gauge	 09930-10121 Spark plug socket wrench set	 09930-11950 Torx wrench	 09930-82710 Mode select switch
 09930-82720 Mode select switch	 99565-01010-009 CD-ROM Ver. 9			

NOTE:
When order the special tool, please confirm whether it is available or not.

TIGHTENING TORQUE

ITEM	N·m	kgf-m	lb-ft
Brake pipe flare nut (For SV650A/SA)	16	1.6	11.5
Fuel delivery pipe mounting screw	5	0.5	3.5
Fuel pump mounting bolt	10	1.0	7.0
HO2 sensor (For E-02, 19, 24, 33)	25	2.5	18.0
Spark plug	11	1.1	8.0
STP sensor mounting screw	3.5	0.35	2.5
TP sensor mounting screw	3.5	0.35	2.5

SAMPLE

SERVICE DATA (SV650/S)

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	31 (1.2)	—
	EX.	25.5 (1.0)	—
Valve clearance (when cold)	IN.	0.1 – 0.2 (0.004 – 0.008)	—
	EX.	0.2 – 0.3 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.020 – 0.047 (0.0008 – 0.0019)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.465 – 4.480 (0.1758 – 0.1764)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	36.8 (1.45)
	OUTER	—	39.8 (1.57)
Valve spring tension (IN. & EX.)	INNER	41 – 47 N (4.2 – 4.8 kgf, 9.03 – 10.36 lbs) at length 29.9 mm (1.18 in)	—
	OUTER	166 – 192 N (17.0 – 19.6 kgf, 36.60 – 42.33 lbs) at length 33.4 mm (1.31 in)	—

SAMPLE

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.060 – 36.105 (1.4196 – 1.4214)	35.76 (1.408)
	EX.	34.680 – 34.725 (1.3654 – 1.3671)	34.38 (1.354)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow "3")	16th pin		—
Cylinder head distortion	—		0.05 (0.002)

SAMPLE

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM		STANDARD	LIMIT
Compression pressure		1 500 kPa (15 kgf/cm², 213 psi)	1 100 kPa (11 kgf/cm², 156 psi)
Compression pressure difference		—	200 kPa (2 kgf/cm², 28 psi)
Piston to cylinder clearance		0.055 – 0.065 (0.0022 – 0.0026)	0.120 (0.0047)
Cylinder bore		81.000 – 81.015 (3.1890 – 3.1896)	81.075 (3.1919)
Piston diam.		80.940 – 80.955 (3.1866 – 3.1872) Measure at 20 mm (0.79 in) from the skirt end.	80.88 (3.184)
Cylinder distortion		—	0.05 (0.002)
Piston ring free end gap	1st	* Approx. 7 (0.28)	* 5.6 (0.22)
	2nd	Approx. 11 (0.43)	8.8 (0.34)
Piston ring end gap	1st	* 0.20 – 0.30 (0.008 – 0.012)	0.70 (0.028)
	2nd	* 0.30 – 0.45 (0.012 – 0.0018)	0.70 (0.028)
Piston ring to groove clearance	1st	—	0.180 (0.0071)
	2nd	—	0.150 (0.0059)
Piston ring groove width	1st	* 0.83 – 0.85 (0.0327 – 0.0335)	—
		* 1.30 – 1.32 (0.0512 – 0.0520)	—
	2nd	1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil	2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st	* 0.76 – 0.81 (0.0299 – 0.0319)	—
		* 1.08 – 1.10 (0.0425 – 0.0433)	—
	2nd	0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore		20.002 – 20.008 (0.7875 – 0.7877)	20.030 (0.7886)
Piston pin O.D.		19.992 – 20.000 (0.7871 – 0.7874)	19.980 (0.7866)

SAMPLE

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.170 – 0.320 (0.0067 – 0.0126)	0.5 (0.02)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)	—
Crank pin width	42.17 – 42.22 (1.660 – 1.662)	—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)	0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4960)	—
Crankshaft journal oil clearance	0.002 – 0.029 (0.0001 – 0.0011)	0.080 (0.0031)
Crankshaft journal O.D.	41.985 – 42.000 (1.6529 – 1.6535)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pressure (at 60 °C, 140 °F)	Above 200 kPa (2.0 kgf/cm², 28 psi) Below 600 kPa (6.0 kgf/cm², 85 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch cable play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1 & No. 2	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Drive plate claw width	No. 1 & No. 2	13.7 – 13.8 (0.539 – 0.543)	12.9 (0.507)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	53.1 (2.09)		50.5 (1.99)

SAMPLE

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		2.088 (71/34)		—
Final reduction ratio	SV650	3.000 (45/15)		—
	SV650S	* 3.000 (45/15)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.777 (32/18)		—
	3rd	1.380 (29/21)		—
	4th	1.125 (27/24)		—
	5th	0.961 (25/26)		—
	Top	0.851 (23/27)		—
Shift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)		0.50 (0.020)
Shift fork groove width		5.5 – 5.6 (0.217 – 0.220)		—
Shift fork thickness		5.3 – 5.4 (0.209 – 0.213)		—
Drive chain	Type	DID525V8		— —
	Links	SV650	110 links	—
		SV650S	108 links	—
	20-pitch length	—		319.4 (12.57)
Drive chain slack (on side-stand)		20 – 30 (0.79 – 1.18)		—
Gearshift lever height	SV650	60 – 70 (2.4 – 2.8)		—
	SV650S	55 – 60 (2.2 – 2.4)		—

SAMPLE

THERMOSTAT + RADIATOR + FAN + COOLANT

ITEM	STANDARD		NOTE
Thermostat valve opening temperature	* Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	* Over 8.0 mm (0.31 in) at 90 °C (194 °F)		—
Engine coolant temperature sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	40 °C (104 °F)	Approx. 1.148 kΩ	—
	60 °C (140 °F)	Approx. 0.587 kΩ	—
	80 °C (176 °F)	Approx. 0.322 kΩ	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 98 °C (208 °F)	—
	ON→OFF	Approx. 92 °C (198 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant including reserve	Reserve tank side	Approx. 250 ml (0.26/0.22 US/Imp qt)	—
	Engine side	Approx. 1 480 ml (1.43/1.19 US/Imp qt)	—

SAMPLE

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Min 168 ml (5.7/5.9 US/Imp oz) for 10 sec. at 300 kPa (3.0 kgf/cm², 43 psi)	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

FI SENSORS

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	130 – 240 Ω		
CKP sensor peak voltage	3.7 V (When cranking) and more		
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	* Approx. 2.5 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	* Approx. 1.1 V	
	Opened	* Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	* Approx. 2.5 kΩ at 20 °C (68 °F)		
TO sensor resistance	19.1 – 19.7 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning 65°	3.7 – 4.4 V	
GP switch voltage	1.0 V and more (From 1st to Top)		
Injector voltage	Battery voltage		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	* Approx. 0.6 V	
	Opened	* Approx. 4.5 V	
STV actuator resistance	* Approx. 7 Ω		
PAIR solenoid valve resistance	* 18 – 22 kΩ at 20 – 30 °C (68 – 86 °F)		
ISC valve resistance	* Approx. 30 ± 1.2 Ω at 20 °C (68 °F)		
Heated oxygen sensor output voltage	* 0.3 V and less at idle speed		E-02, 19, 24, 33
	* 0.6 V and more at 5 000 r/min		
Heated oxygen sensor resistance	* 6.5 – 9.5 Ω at 23 °C (73.4 °F)		E-02, 19, 24, 33

SAMPLE

THROTTLE BODY

ITEM	SPECIFICATION
I.D. No.	* 17G2 (Others), 17G3 (For E-33)
Bore size	39 mm
Fast idle r/min.	* 1 800 – 2 200 r/min at 25 °C (77 °F)
Idle r/min.	1 300 ± 100 r/min/Warmed engine
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

<table>
<tr><th colspan="3">ITEM</th><th colspan="2">SPECIFICATION</th><th>NOTE</th></tr>
<tr><td colspan="3">Firing order</td><td colspan="2">1.2</td><td></td></tr>
<tr><td colspan="3" rowspan="2">Spark plug</td><td>Type</td><td>NGK: CR8E
DENSO: U24ESR-N</td><td></td></tr>
<tr><td>Gap</td><td>0.7 – 0.8 mm
(0.028 – 0.031 in)</td><td></td></tr>
<tr><td colspan="3">Spark performance</td><td colspan="2">Over 8 mm (0.3 in) at 1 atm.</td><td></td></tr>
<tr><td colspan="3">Crankshaft position sensor resistance</td><td colspan="2">130 – 240 Ω</td><td>Bl – G</td></tr>
<tr><td colspan="3" rowspan="2">Ignition coil resistance</td><td>Primary</td><td>1 – 5 Ω</td><td>Terminal – Terminal</td></tr>
<tr><td>Secondary</td><td>25 – 40 kΩ</td><td>Plug cap – Plug cap</td></tr>
<tr><td colspan="3">Crankshaft position sensor peak voltage</td><td colspan="2">3.7 V and more</td><td>When cranking</td></tr>
<tr><td colspan="3">Ignition coil primary peak voltage</td><td colspan="2">150 V and more</td><td></td></tr>
<tr><td colspan="3">Generator coil resistance</td><td colspan="2">0.2 – 0.7 Ω</td><td></td></tr>
<tr><td colspan="3">Generator Max. output</td><td colspan="2">Approx. 375 W at 5 000 r/min</td><td></td></tr>
<tr><td colspan="3">Generator no-load voltage
(When cold)</td><td colspan="2">60 V (AC) and more at 5 000 r/min.</td><td></td></tr>
<tr><td colspan="3">Regulated voltage</td><td colspan="2">14.0 – 15.5 V at 5 000 r/min.</td><td></td></tr>
<tr><td colspan="3">Starter relay resistance</td><td colspan="2">3 – 6 Ω</td><td></td></tr>
<tr><td rowspan="2">Battery</td><td colspan="2">Type designation</td><td colspan="2">YTX12-BS</td><td></td></tr>
<tr><td colspan="2">Capacity</td><td colspan="2">12 V 36.0 kC (10 Ah)/10 HR</td><td></td></tr>
<tr><td rowspan="9">Fuze size</td><td rowspan="4">Headlight</td><td rowspan="2">HI</td><td>SV650</td><td>10 A</td><td></td></tr>
<tr><td>SV650S</td><td>15 A</td><td></td></tr>
<tr><td rowspan="2">LO</td><td>SV650</td><td>10 A</td><td></td></tr>
<tr><td>SV650S</td><td>15 A</td><td></td></tr>
<tr><td colspan="2">Fuel</td><td colspan="2">10 A</td><td></td></tr>
<tr><td colspan="2">Ignition</td><td colspan="2">10 A</td><td></td></tr>
<tr><td colspan="2">Fan motor</td><td colspan="2">15 A</td><td></td></tr>
<tr><td colspan="2">Signal</td><td colspan="2">10 A</td><td></td></tr>
<tr><td colspan="2">Main</td><td colspan="2">30 A</td><td></td></tr>
</table>

SAMPLE

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		SV650S	SV650	
			E-03, 24, 28, 33	Others
Headlight	HI	60 × 2	60	←
	LO	55 × 2	55	←
Parking or position light		5 × 2		5
Brake light/Taillight		LED	←	←
Turn signal light		21	←	←
License light		5	←	←
Speedometer light		LED	←	←
Tachometer light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure/coolant temp./FI indicator light		LED	←	←
Fuel indicator light		LED	←	←

SAMPLE

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	SV650	50 – 60 (1.97 – 2.36)	—
	SV650S	60 – 70 (2.36 – 2.76)	
Brake disc thickness	Front	4.5 (0.18)	4.0 (0.16)
	Rear	5.0 (0.20)	4.5 (0.18)
Brake disc runout	—		0.3 (0.012)
Master cylinder bore	Front	15.870 – 15.913 (0.6248 – 0.6265)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	15.827 – 15.854 (0.6231 – 0.6242)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—
Brake caliper cylinder bore	Front	30.230 – 30.306 (1.1902 – 1.1931)	—
	Rear	38.180 – 38.230 (1.5031 – 1.5051)	—
Brake caliper piston diam.	Front	30.150 – 30.200 (1.1870 – 1.1890)	—
	Rear	38.080 – 38.130 (1.4992 – 1.5012)	—
Brake fluid type	DOT 4		
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	17 M/C × MT3.50	—
	Rear	17 M/C × MT4.50	—
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)

SAMPLE

TIRE

ITEM	STD/SPEC.		LIMIT
Cold inflation tire pressure (Solo riding)	Front	225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	225 kPa (2.25 kgf/cm², 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)	—
Tire size	Front	120/60 ZR17 M/C (55 W)	—
	Rear	160/60 ZR17 M/C (69 W)	—
Tire type	Front	DUNLOP: D220FST L	—
	Rear	DUNLOP: D220ST L	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SAMPLE

SUSPENSION

Unit: mm (in)

ITEM	STD/SPEC.		LIMIT
Front fork stroke	SV650	130 (5.1)	—
	SV650S	125 (4.9)	
Front fork spring free length	SV650	429 (16.89)	420 (16.5)
	SV650S	437.4 (17.22)	428 (16.8)
Front fork oil level (without spring, outer tube fully compressed)	SV650	92 (3.62)	—
	SV650S	94 (3.70)	
Front fork spring adjuster	3rd groove from Top		—
Front fork oil type	SUZUKI FORK OIL SS8 or equivalent fork oil		—
Front fork oil capacity (each leg)	SV650	490 ml (20.2/17.3 US/Imp oz)	—
	SV650S	485 ml (16.4/17.1 US/Imp oz)	—
Rear shock absorber spring pre-set length	SV650	3/7	—
	SV650S	4/7	—
Rear wheel travel	SV650	137 (5.4)	—
	SV650S	134 (5.3)	—
Swingarm pivot shaft runout	—		0.3 (0.01)

FUEL + OIL

ITEM	STD/SPEC.		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		Others
Fuel tank capacity	16 L (4.2/3.5 US/Imp gal)		E-33
	17 L (4.5/3.7 US/Imp gal)		Others
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	2 300 ml (2.4/2.0 US/Imp qt)	
	Filter change	2 700 ml (2.9/2.4 US/Imp qt)	
	Overhaul	3 100 ml (3.3/2.7 US/Imp qt)	

SAMPLE

SERVICE DATA (SV650A/SA)

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	31 (1.2)	—
	EX.	25.5 (1.0)	—
Valve clearance (when cold)	IN.	0.1 – 0.2 (0.004 – 0.008)	—
	EX.	0.2 – 0.3 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.020 – 0.047 (0.0008 – 0.0019)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.465 – 4.480 (0.1758 – 0.1764)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	36.8 (1.45)
	OUTER	—	39.8 (1.57)
Valve spring tension (IN. & EX.)	INNER	41 – 47 N (4.2 – 4.8 kgf, 9.03 – 10.36 lbs) at length 29.9 mm (1.18 in)	—
	OUTER	166 – 192 N (17.0 – 19.6 kgf, 36.60 – 42.33 lbs) at length 33.4 mm (1.31 in)	—

SAMPLE

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.060 – 36.105 (1.4196 – 1.4214)	35.76 (1.408)
	EX.	34.680 – 34.725 (1.3654 – 1.3671)	34.38 (1.354)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow "3")	16th pin		—
Cylinder head distortion	—		0.05 (0.002)

SAMPLE

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

<table>
<tr><th>ITEM</th><th colspan="2">STANDARD</th><th>LIMIT</th></tr>
<tr><td>Compression pressure</td><td colspan="2">1 500 kPa
(15 kgf/cm², 213 psi)</td><td>1 100 kPa
(11 kgf/cm²,
156 psi)</td></tr>
<tr><td>Compression pressure difference</td><td colspan="2">—</td><td>200 kPa
(2 kgf/cm²,
28 psi)</td></tr>
<tr><td>Piston to cylinder clearance</td><td colspan="2">0.055 – 0.065
(0.0022 – 0.0026)</td><td>0.120
(0.0047)</td></tr>
<tr><td>Cylinder bore</td><td colspan="2">81.000 – 81.015
(3.1890 – 3.1896)</td><td>81.075
(3.1919)</td></tr>
<tr><td>Piston diam.</td><td colspan="2">80.940 – 80.955
(3.1866 – 3.1872)
Measure at 20 mm (0.79 in) from the skirt end.</td><td>80.88
(3.184)</td></tr>
<tr><td>Cylinder distortion</td><td colspan="2">—</td><td>0.05
(0.002)</td></tr>
<tr><td rowspan="2">Piston ring free end gap</td><td>1st</td><td>Approx. 7 (0.28)</td><td>5.6
(0.22)</td></tr>
<tr><td>2nd</td><td>Approx. 11 (0.43)</td><td>8.8
(0.34)</td></tr>
<tr><td rowspan="2">Piston ring end gap</td><td>1st</td><td>0.20 – 0.30
(0.008 – 0.012)</td><td>0.70
(0.028)</td></tr>
<tr><td>2nd</td><td>0.30 – 0.45
(0.012 – 0.0018)</td><td>0.70
(0.028)</td></tr>
<tr><td rowspan="2">Piston ring to groove clearance</td><td>1st</td><td>—</td><td>0.180
(0.0071)</td></tr>
<tr><td>2nd</td><td>—</td><td>0.150
(0.0059)</td></tr>
<tr><td rowspan="4">Piston ring groove width</td><td rowspan="2">1st</td><td>0.83 – 0.85
(0.0327 – 0.0335)</td><td>—</td></tr>
<tr><td>1.30 – 1.32
(0.0512 – 0.0520)</td><td>—</td></tr>
<tr><td>2nd</td><td>1.01 – 1.03
(0.0398 – 0.0406)</td><td>—</td></tr>
<tr><td>Oil</td><td>2.01 – 2.03
(0.0791 – 0.0799)</td><td>—</td></tr>
<tr><td rowspan="3">Piston ring thickness</td><td rowspan="2">1st</td><td>0.76 – 0.81
(0.0299 – 0.0319)</td><td>—</td></tr>
<tr><td>1.08 – 1.10
(0.0425 – 0.0433)</td><td>—</td></tr>
<tr><td>2nd</td><td>0.97 – 0.99
(0.0382 – 0.0390)</td><td>—</td></tr>
<tr><td>Piston pin bore</td><td colspan="2">20.002 – 20.008
(0.7875 – 0.7877)</td><td>20.030
(0.7886)</td></tr>
<tr><td>Piston pin O.D.</td><td colspan="2">19.992 – 20.000
(0.7871 – 0.7874)</td><td>19.980
(0.7866)</td></tr>
</table>

SAMPLE

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.170 – 0.320 (0.0067 – 0.0126)	0.5 (0.02)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)	—
Crank pin width	42.17 – 42.22 (1.660 – 1.662)	—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)	0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4960)	—
Crankshaft journal oil clearance	0.002 – 0.029 (0.0001 – 0.0011)	0.080 (0.0031)
Crankshaft journal O.D.	41.985 – 42.000 (1.6529 – 1.6535)	—
Crankshaft runout	—	0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pressure (at 60 °C, 140 °F)	Above 200 kPa (2.0 kgf/cm², 28 psi) Below 600 kPa (6.0 kgf/cm², 85 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch cable play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1/4 turn back		—
Drive plate thickness	No. 1 & No. 2	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Drive plate claw width	No. 1 & No. 2	13.7 – 13.8 (0.539 – 0.543)	12.9 (0.507)
Driven plate distortion	—		0.10 (0.004)
Clutch spring free length	53.1 (2.09)		50.5 (1.99)

SAMPLE

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM			STANDARD	LIMIT
Primary reduction ratio			2.088 (71/34)	—
Final reduction ratio		SV650A	3.000 (45/15)	—
		SV650SA	3.000 (45/15)	—
Gear ratios	Low		2.461 (32/13)	—
	2nd		1.777 (32/18)	—
	3rd		1.380 (29/21)	—
	4th		1.125 (27/24)	—
	5th		0.961 (25/26)	—
	Top		0.851 (23/27)	—
Shift fork to groove clearance			0.1 – 0.3 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width			5.5 – 5.6 (0.217 – 0.220)	—
Shift fork thickness			5.3 – 5.4 (0.209 – 0.213)	—
Drive chain	Type		DID525V8	— —
	Links	SV650A	** 114 links	—
		SV650SA	** 114 links	
	20-pitch length		—	319.4 (12.57)
Drive chain slack (on side-stand)			20 – 30 (0.79 – 1.18)	—
Gearshift lever height		SV650A	60 – 70 (2.4 – 2.8)	—
		SV650SA	55 – 60 (2.2 – 2.4)	—

SAMPLE

THERMOSTAT + RADIATOR + FAN + COOLANT

ITEM	STANDARD		NOTE
Thermostat valve opening temperature	Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	Over 8.0 mm (0.31 in) at 90 °C (194 °F)		—
Engine coolant temperature sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	40 °C (104 °F)	Approx. 1.148 kΩ	—
	60 °C (140 °F)	Approx. 0.587 kΩ	—
	80 °C (176 °F)	Approx. 0.322 kΩ	—
Radiator cap valve opening pressure	95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)		—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 98 °C (208 °F)	—
	ON→OFF	Approx. 92 °C (198 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant including reserve	Reserve tank side	Approx. 250 ml (0.26/0.22 US/lmp qt)	—
	Engine side	Approx. 1 480 ml (1.43/1.19 US/lmp qt)	—

SAMPLE

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	Min 168 ml (5.7/5.9 US/lmp oz) for 10 sec. at 300 kPa (3.0 kgf/cm², 43 psi)	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm², 43 psi)	

FI SENSORS

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	130 – 240 Ω		
CKP sensor peak voltage	3.7 V (When cranking) and more		
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.5 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.5 kΩ at 20 °C (68 °F)		
TO sensor resistance	19.1 – 19.7 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning 65°	3.7 – 4.4 V	
GP switch voltage	1.0 V and more (From 1st to Top)		
Injector voltage	Battery voltage		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7 Ω		
PAIR solenoid valve resistance	18 – 22 kΩ at 20 – 30 °C (68 – 86 °F)		
ISC valve resistance	Approx. 30 ± 1.2 Ω at 20 °C (68 °F)		
Heated oxygen sensor output voltage	0.3 V and less at idle speed		E-02, 19, 24, 33
	0.6 V and more at 5 000 r/min		
Heated oxygen sensor resistance	6.5 – 9.5 Ω at 23 °C (73.4 °F)		E-02, 19, 24, 33

SAMPLE

THROTTLE BODY

ITEM	SPECIFICATION
I.D. No.	17G2 (Others), 17G3 (For E-33)
Bore size	39 mm
Fast idle r/min.	1 800 – 2 200 r/min at 25 °C (77 °F)
Idle r/min.	1 300 ± 100 r/min/Warmed engine
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION		NOTE
Firing order			1.2		
Spark plug			Type	NGK: CR8E DENSO: U24ESR-N	
			Gap	0.7 – 0.8 mm (0.028 – 0.031 in)	
Spark performance			Over 8 mm (0.3 in) at 1 atm.		
Crankshaft position sensor resistance			130 – 240 Ω		BI – G
Ignition coil resistance			Primary	1 – 5 Ω	Terminal – Terminal
			Secondary	25 – 40 kΩ	Plug cap – Plug cap
Crankshaft position sensor peak voltage			3.7 V and more		When cranking
Ignition coil primary peak voltage			150 V and more		
Generator coil resistance			0.2 – 0.7 Ω		
Generator Max. output			Approx. 375 W at 5 000 r/min		
Generator no-load voltage (When cold)			60 V (AC) and more at 5 000 r/min.		
Regulated voltage			14.0 – 15.5 V at 5 000 r/min.		
Starter relay resistance			3 – 6 Ω		
Battery	Type designation		** YT12A-BS		
	Capacity		12 V 36.0 kC (10 Ah)/10 HR		
Fuze size	Headlight	HI	SV650A	10 A	
			SV650SA	15 A	
		LO	SV650A	10 A	
			SV650SA	15 A	
	Fuel		10 A		
	Ignition		10 A		
	Fan motor		15 A		
	Signal		10 A		
	Main		30 A		
	ABS motor		** 40 A		
	ABS valve		** 25 A		

SAMPLE

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		SV650SA	SV650A	
			E-03, 24, 28, 33	Others
Headlight	HI	60 × 2	60	←
	LO	55 × 2	55	←
Parking or position light		5 × 2		5
Brake light/Taillight		LED	←	←
Turn signal light		21	←	←
License light		5	←	←
Speedometer light		LED	←	←
Tachometer light		LED	←	←
Turn signal indicator light		LED	←	←
High beam indicator light		LED	←	←
Neutral indicator light		LED	←	←
Oil pressure/coolant temp./FI indicator light		LED	←	←
Fuel indicator light		LED	←	←
ABS indicator light		** LED	←	←

SAMPLE

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal height	SV650	50 – 60 (1.97 – 2.36)	—
	SV650S	60 – 70 (2.36 – 2.76)	
Brake disc thickness	Front	4.5 (0.18)	4.0 (0.16)
	Rear	5.0 (0.20)	4.5 (0.18)
Brake disc runout	—		0.3 (0.012)
Master cylinder bore	Front	** 14.000 – 14.043 (0.5512 – 0.5529)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	** 13.957 – 13.984 (0.5495 – 0.5506)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—
Brake caliper cylinder bore	Front	** 27.000 – 27.076 (1.0630 – 1.0660)	—
	Rear	38.180 – 38.230 (1.5031 – 1.5051)	—
Brake caliper piston diam.	Front	** 26.920 – 26.970 (1.0598 – 1.0618)	—
	Rear	38.080 – 38.130 (1.4992 – 1.5012)	—
Brake fluid type	DOT 4		
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel rim size	Front	17 M/C × MT3.50	—
	Rear	17 M/C × MT4.50	—
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel speed sensor to sensor rotor clearance	Front & Rear	** 0.3 – 1.5 (0.012 – 0.059)	—

SAMPLE

TIRE

ITEM	STD/SPEC.			LIMIT
Cold inflation tire pressure (Solo riding)	Front	225 kPa (2.25 kgf/cm², 33 psi)		—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Cold inflation tire pressure (Dual riding)	Front	225 kPa (2.25 kgf/cm², 33 psi)		—
	Rear	250 kPa (2.50 kgf/cm², 36 psi)		—
Tire size	Front	120/60 ZR17 M/C (55 W)		—
	Rear	160/60 ZR17 M/C (69 W)		—
Tire type	Front	SV650A	** DUNLOP: D220FST	—
	Rear	SV650SA	** DUNLOP: D220FST M	—
Tire tread depth	Front	—		1.6 (0.06)
	Rear	—		2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STD/SPEC.		LIMIT
Front fork stroke	SV650A	130 (5.1)	—
	SV650SA	** 130 (5.1)	
Front fork spring free length	SV650A	429 (16.89)	420 (16.5)
	SV650SA	437.4 (17.22)	428 (16.8)
Front fork oil level (without spring, outer tube fully compressed)	SV650A	92 (3.62)	—
	SV650SA	94 (3.70)	
Front fork spring adjuster	3rd groove from Top		—
Front fork oil type	SUZUKI FORK OIL SS8 or equivalent fork oil		—
Front fork oil capacity (each leg)	SV650A	490 ml (20.2/17.3 US/Imp oz)	—
	SV650SA	485 ml (16.4/17.1 US/Imp oz)	—
Rear shock absorber spring pre-set length	SV650A	3/7	—
	SV650SA	** 3/7	—
Rear wheel travel	SV650A	** 147 (5.8)	—
	SV650SA	** 147 (5.8)	—
Swingarm pivot shaft runout	—		0.3 (0.01)

SAMPLE

FUEL + OIL

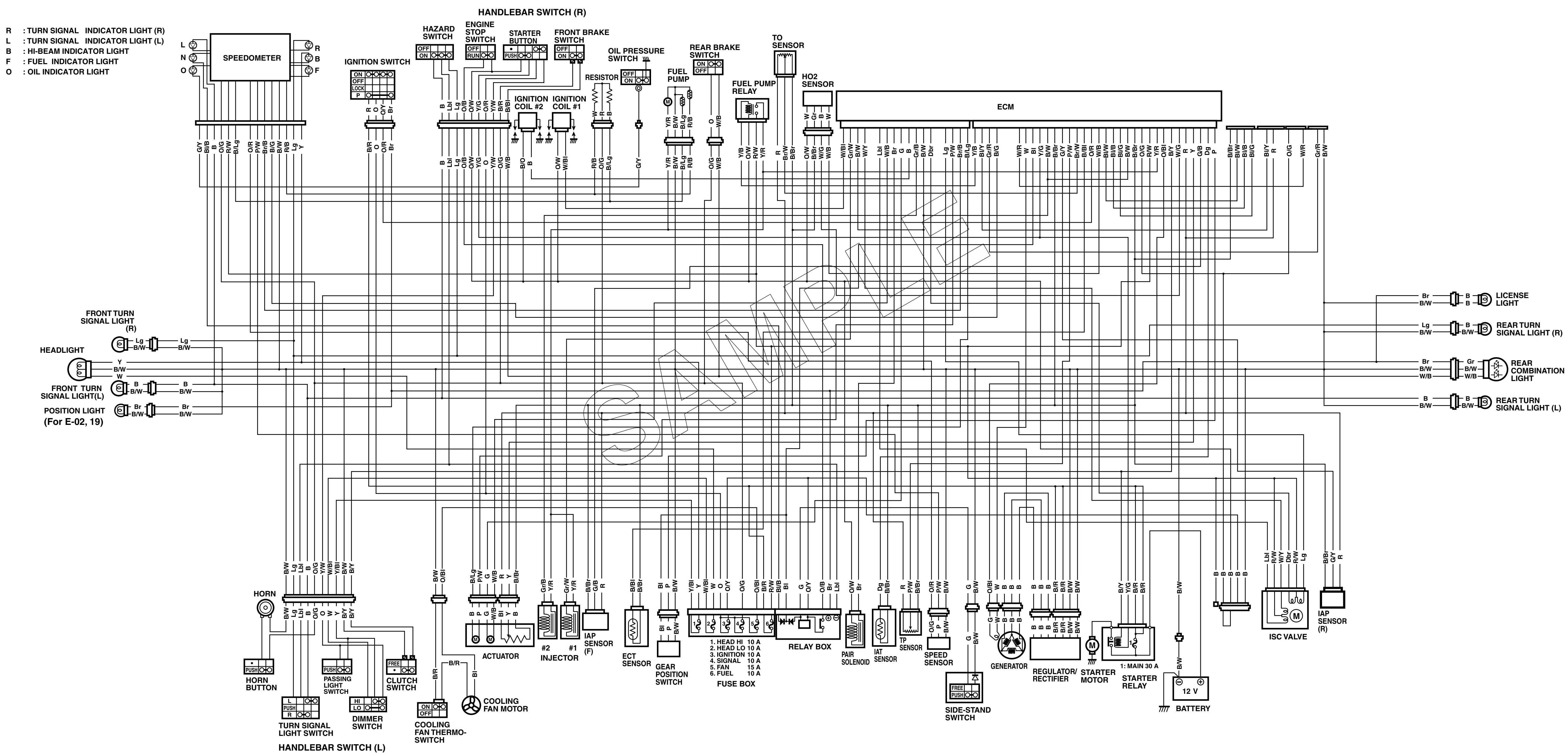
ITEM	STD/SPEC.		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		Others
Fuel tank capacity	16 L (4.2/3.5 US/Imp gal)		E-33
	17 L (4.5/3.7 US/Imp gal)		Others
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	2 300 ml (2.4/2.0 US/Imp qt)	
	Filter change	2 700 ml (2.9/2.4 US/Imp qt)	
	Overhaul	3 100 ml (3.3/2.7 US/Imp qt)	

SAMPLE

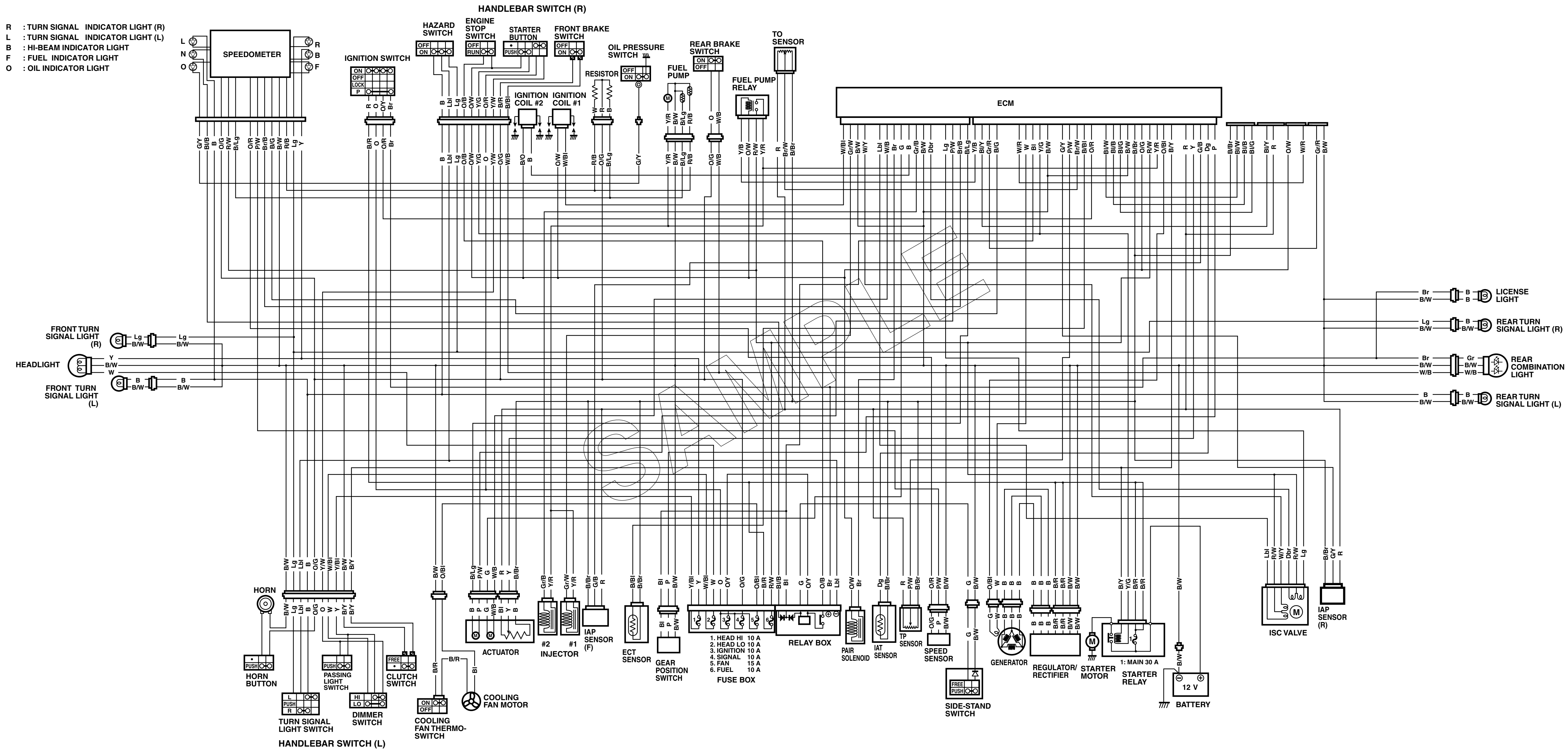
WIRING DIAGRAM

SV650K7 (For E-02, 19, 24, 33)

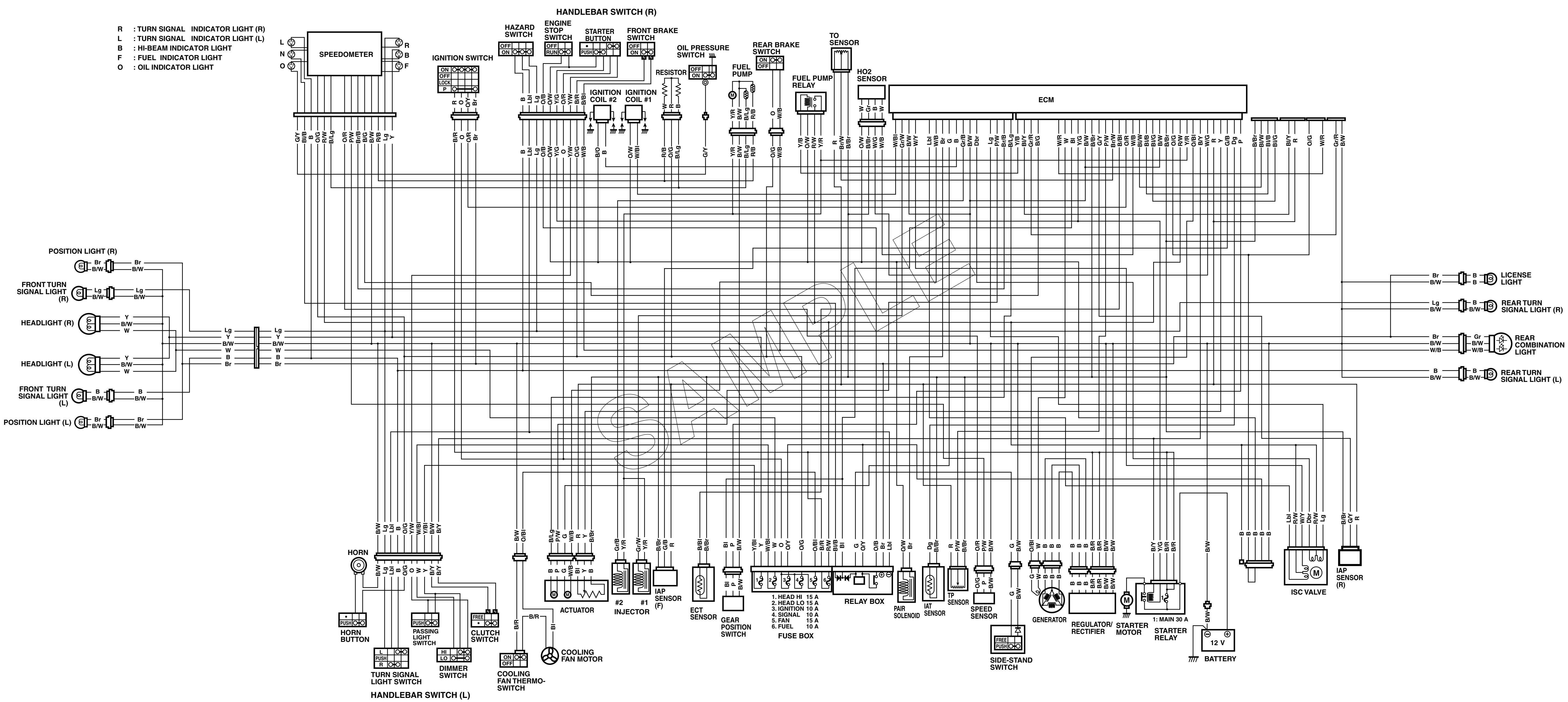
Wiring diagrams wire color, refer to SV650/S service manual section “WIRE COLOR”.



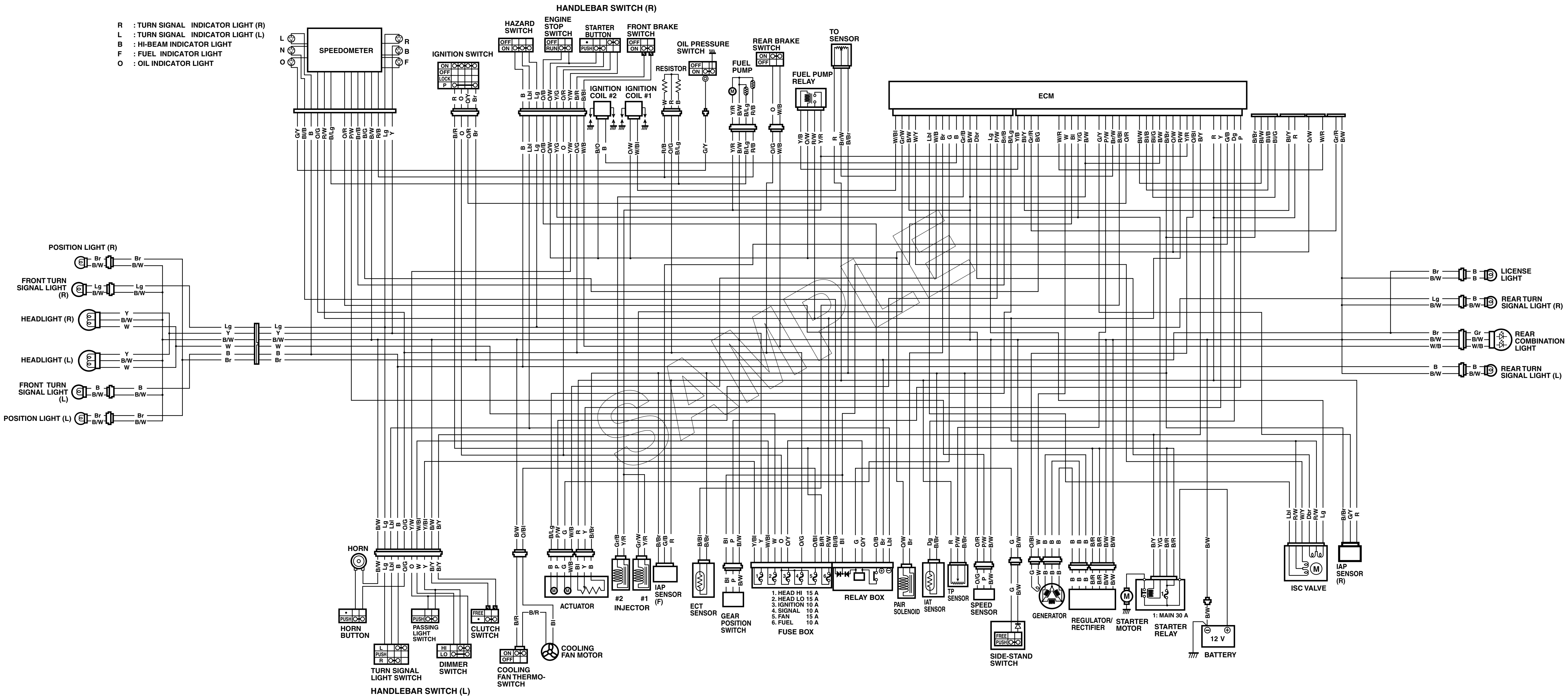
SV650K7 (For E-03, 28)



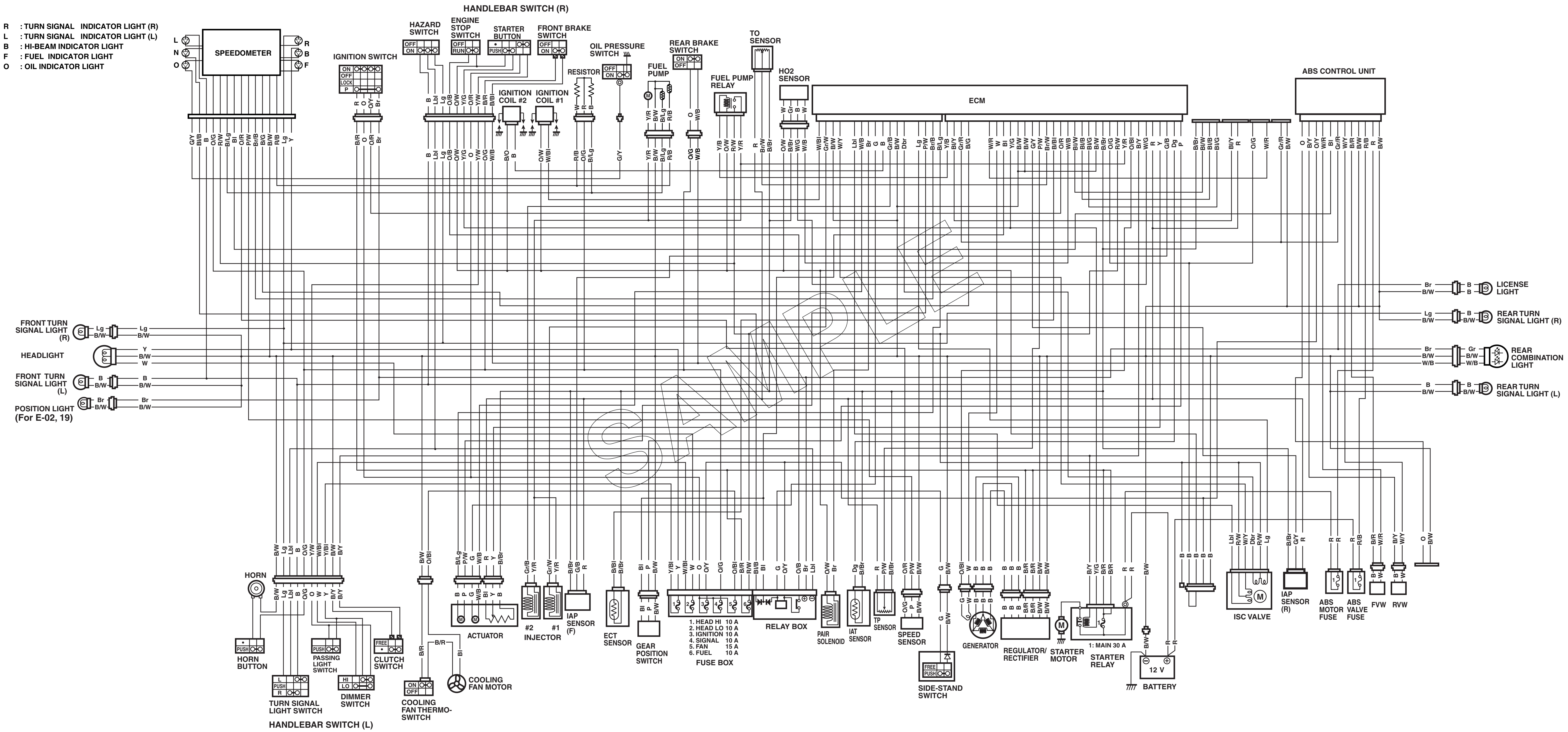
SV650SK7 (For E-02, 19, 24, 33)



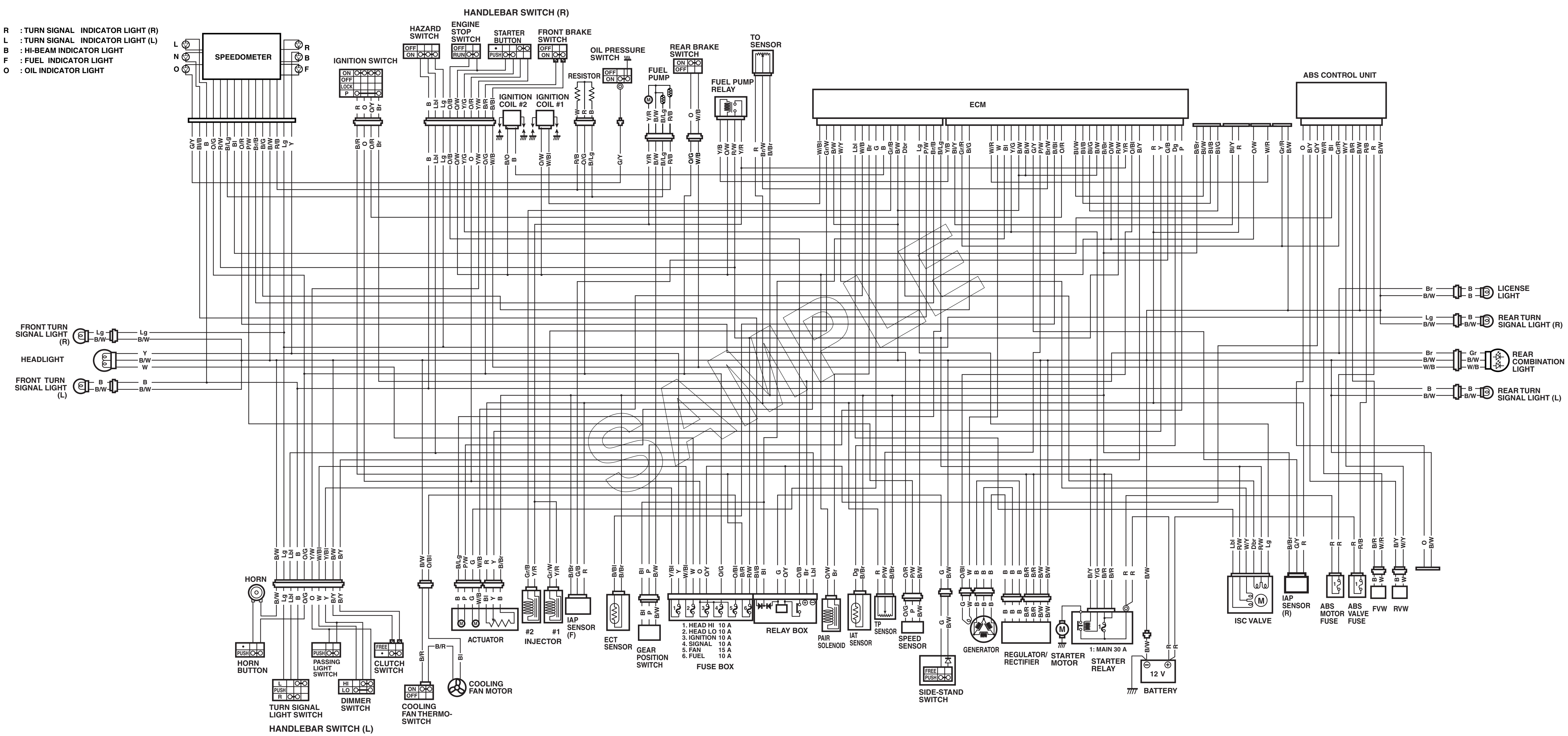
SV650SK7 (For E-03, 28)



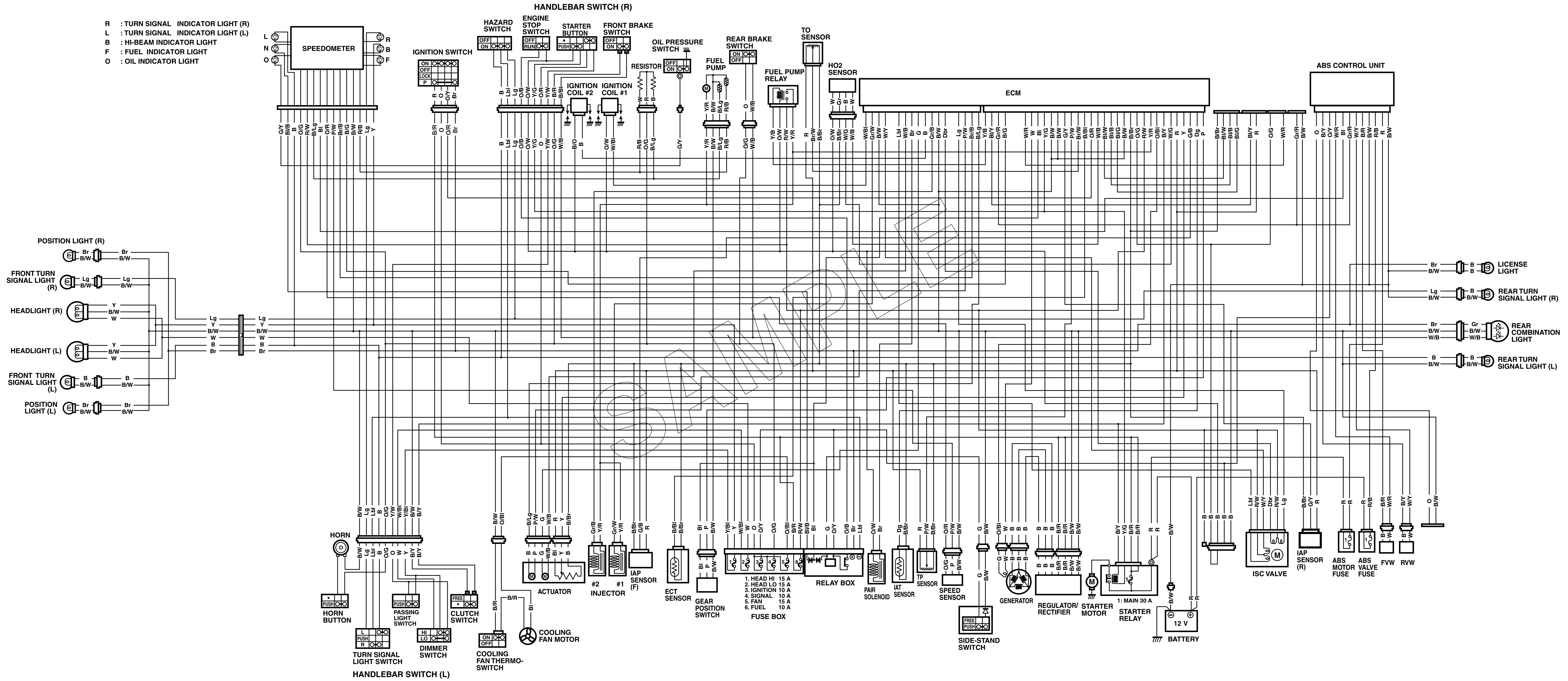
SV650AK7 (For E-02, 19, 24, 33)



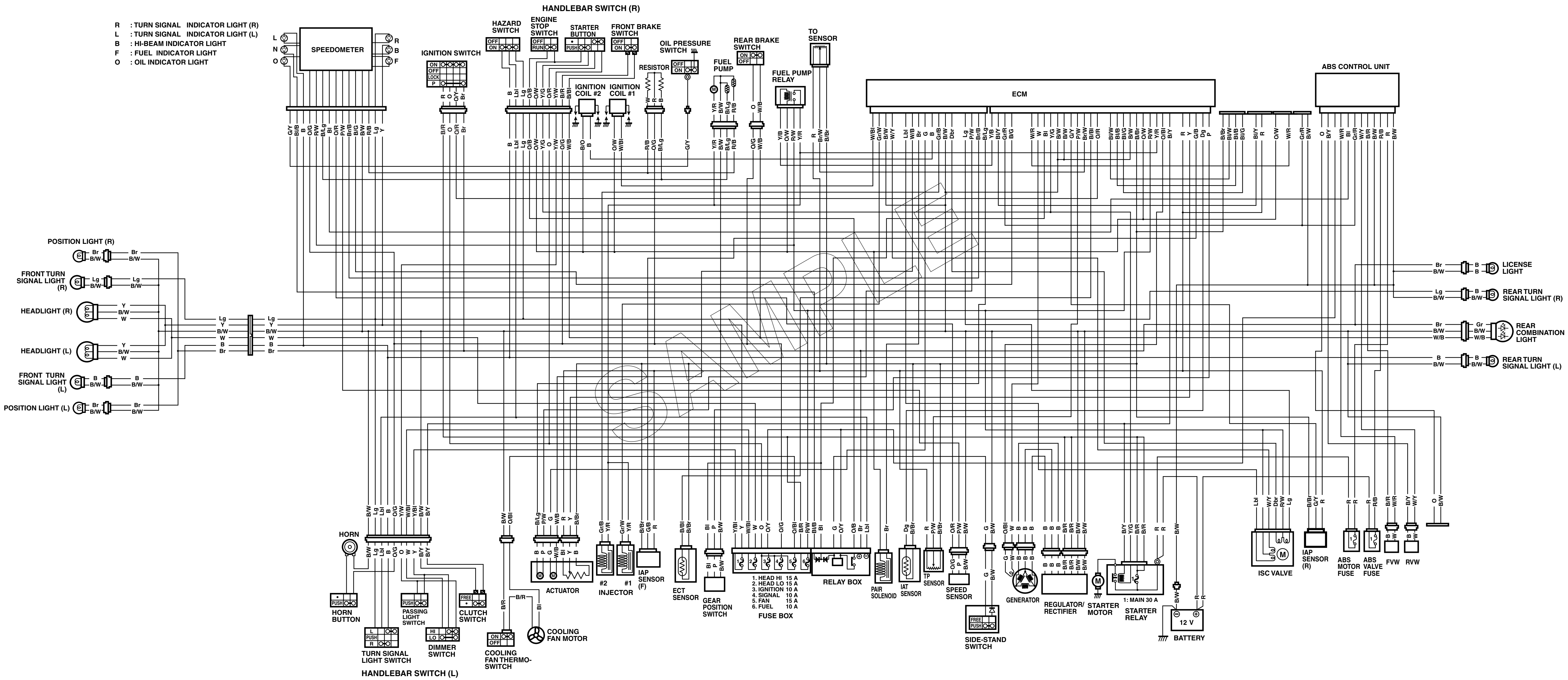
SV650AK7 (For E-03, 28)



SV650SAK7 (For E-02, 19, 24, 33)



SV650SAK7 (For E-03, 28)



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